US009142214B2

(12) **United States Patent**
**Scalisi**

(10) **Patent No.: US 9,142,214 B2**
(45) **Date of Patent: Sep. 22, 2015**

(54) **LIGHT SOCKET CAMERAS**

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(72) Inventor: **Joseph Frank Scalisi**, Yorba Linda, CA (US)

(73) Assignee: **SkyBell Technologies, Inc.**, Irvine, CA (US)

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/549,548**

(22) Filed: **Nov. 21, 2014**

(65) **Prior Publication Data**

US 2015/0077555 A1 Mar. 19, 2015

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 14/469,583, filed on Aug. 27, 2014, now Pat. No. 8,947,530, which is a continuation-in-part of application No. 14/099,888, filed on Dec. 6, 2013, now Pat. No.

(Continued)

(51) **Int. Cl.**

| | |
|---|---|
| ***H04N 7/18*** | (2006.01) |
| ***H04N 9/47*** | (2006.01) |
| ***G10L 15/22*** | (2006.01) |
| ***H05B 37/02*** | (2006.01) |

(Continued)

(52) **U.S. Cl.**

CPC ..... ***G10L 15/22*** (2013.01); ***G06K 9/00288*** (2013.01); ***G07C 9/00563*** (2013.01); ***G08B 13/19636*** (2013.01); ***H04M 1/0291*** (2013.01); ***H04M 11/00*** (2013.01); ***H04M 11/025*** (2013.01); ***H04N 5/23216*** (2013.01); ***H04N 7/183*** (2013.01); ***H04N 7/186*** (2013.01); ***H04N 7/188*** (2013.01); ***H05B 37/02*** (2013.01); *G08B 13/19684* (2013.01); *G10L 2015/223* (2013.01); *H04M 1/7253* (2013.01); *H04M 1/72536* (2013.01)

(58) **Field of Classification Search**

CPC ..... G06F 9/542; G06F 21/88; G06F 21/45; G08B 13/00; H04W 12/06; H04W 4/008; G05B 19/4185; G10L 2015/223; H04N 21/6587

USPC ..... 348/143

See application file for complete search history.

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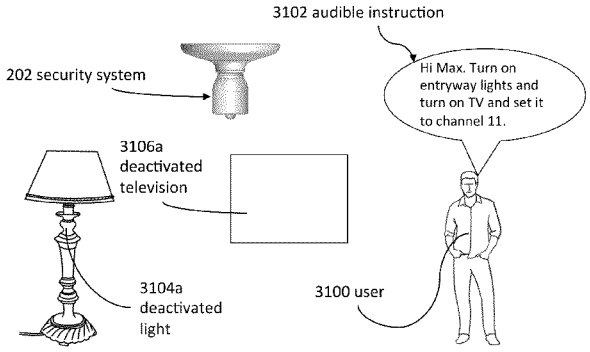
*Primary Examiner* — Andy Rao
*Assistant Examiner* — Jared Walker

(57) **ABSTRACT**

A security system can be used to trigger appliances. The security system can comprise a light socket camera that can be rotatably attached to a light socket of a building. The light socket camera can receive an audible instruction from a user, and in response to receiving the audible instruction from the user, the security system can trigger the appliance to perform an operation.

**20 Claims, 37 Drawing Sheets**



**Related U.S. Application Data**

8,823,795, and a continuation-in-part of application No. 14/142,839, filed on Dec. 28, 2013, now Pat. No. 8,842,180, application No. 14/549,548, which is a continuation-in-part of application No. 14/275,811, filed on May 12, 2014, now Pat. No. 8,872,915, which is a continuation-in-part of application No. 14/098,772, filed on Dec. 6, 2013, now Pat. No. 8,780,201, application No. 14/549,548, which is a continuation-in-part of application No. 14/463,548, filed on Aug. 19, 2014, now Pat. No. 8,941,736, and a continuation of application No. 14/549,545, filed on Nov. 21, 2014, now Pat. No. 9,053,622, and a continuation-in-part of application No. 14/534,588, filed on Nov. 6, 2014.

(60) Provisional application No. 61/872,439, filed on Aug. 30, 2013, provisional application No. 61/859,070, filed on Jul. 26, 2013, provisional application No. 62/018,605, filed on Jun. 29, 2014, provisional application No. 62/039,394, filed on Aug. 19, 2014.

(51) **Int. Cl.**

| | |
|---|---|
| ***H04N 5/232*** | (2006.01) |
| ***G07C 9/00*** | (2006.01) |
| ***G06K 9/00*** | (2006.01) |
| ***H04M 1/02*** | (2006.01) |
| ***H04M 11/00*** | (2006.01) |
| ***H04M 11/02*** | (2006.01) |
| *G08B 13/196* | (2006.01) |
| *H04M 1/725* | (2006.01) |

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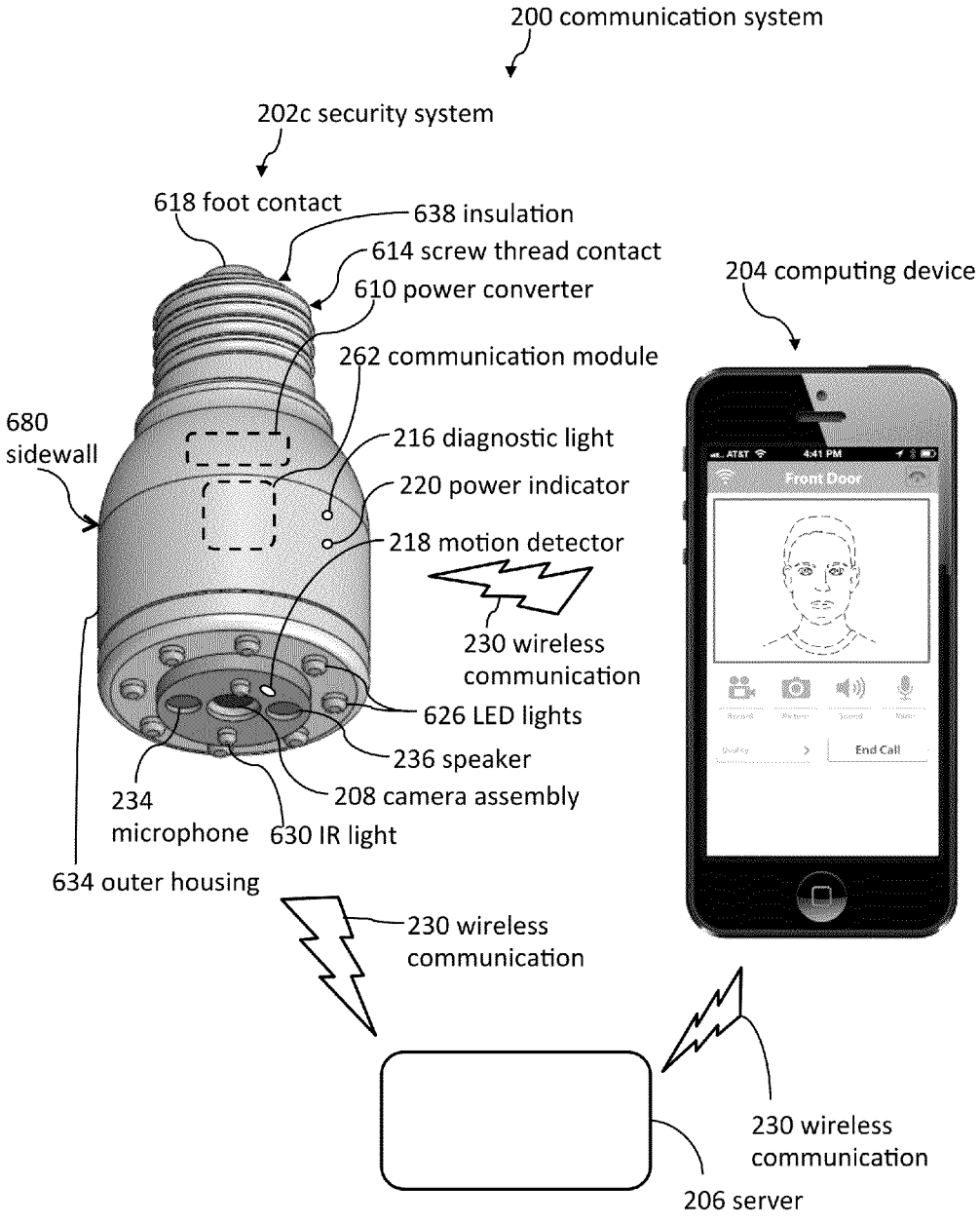
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202c security system
618 foot contact
638 insulation
614 screw thread contact
610 power converter
262 communication module
680 sidewall
216 diagnostic light
220 power indicator
218 motion detector
230 wireless communication
626 LED lights
236 speaker
208 camera assembly
234 microphone
630 IR light
634 outer housing
204 computing device
Front Door
End Call
230 wireless communication
230 wireless communication
206 server

Figure 1a

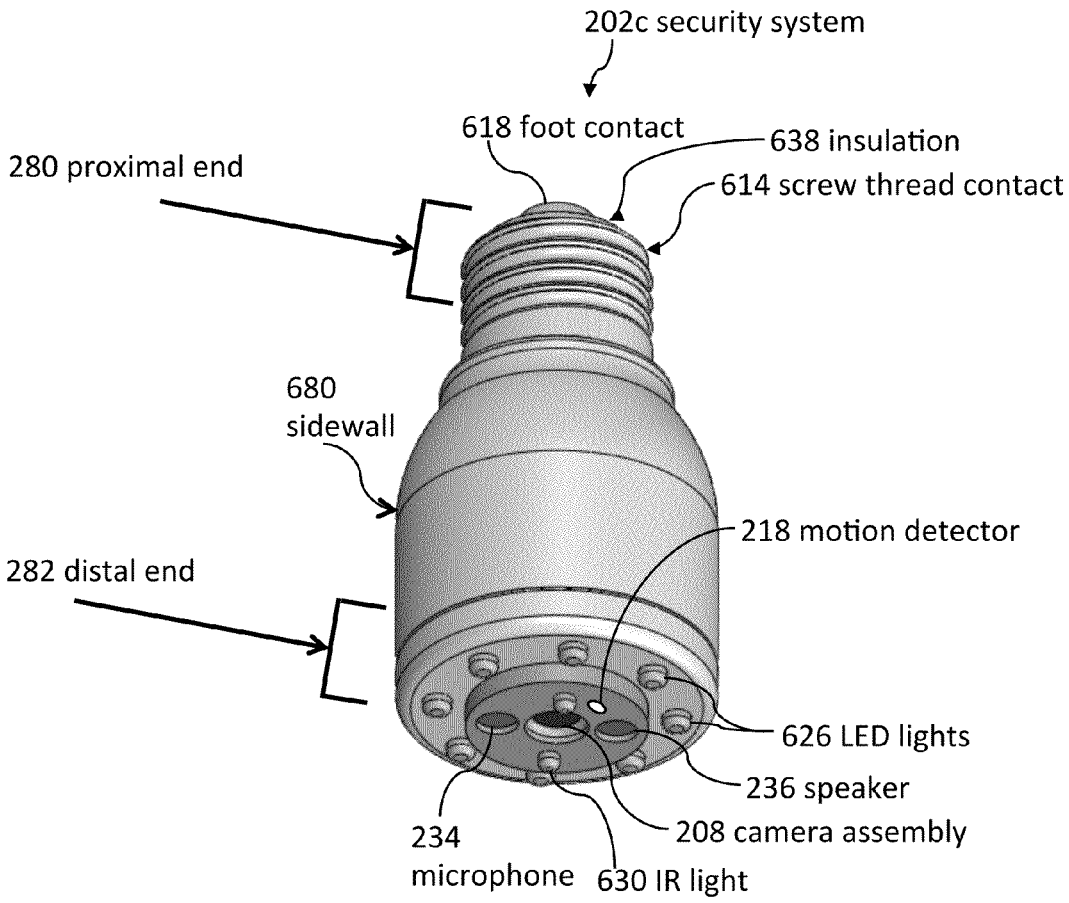

202c security system
618 foot contact
638 insulation
280 proximal end
614 screw thread contact
680
sidewall
218 motion detector
282 distal end
626 LED lights
236 speaker
208 camera assembly
234
microphone
630 IR light

**Figure 1b**

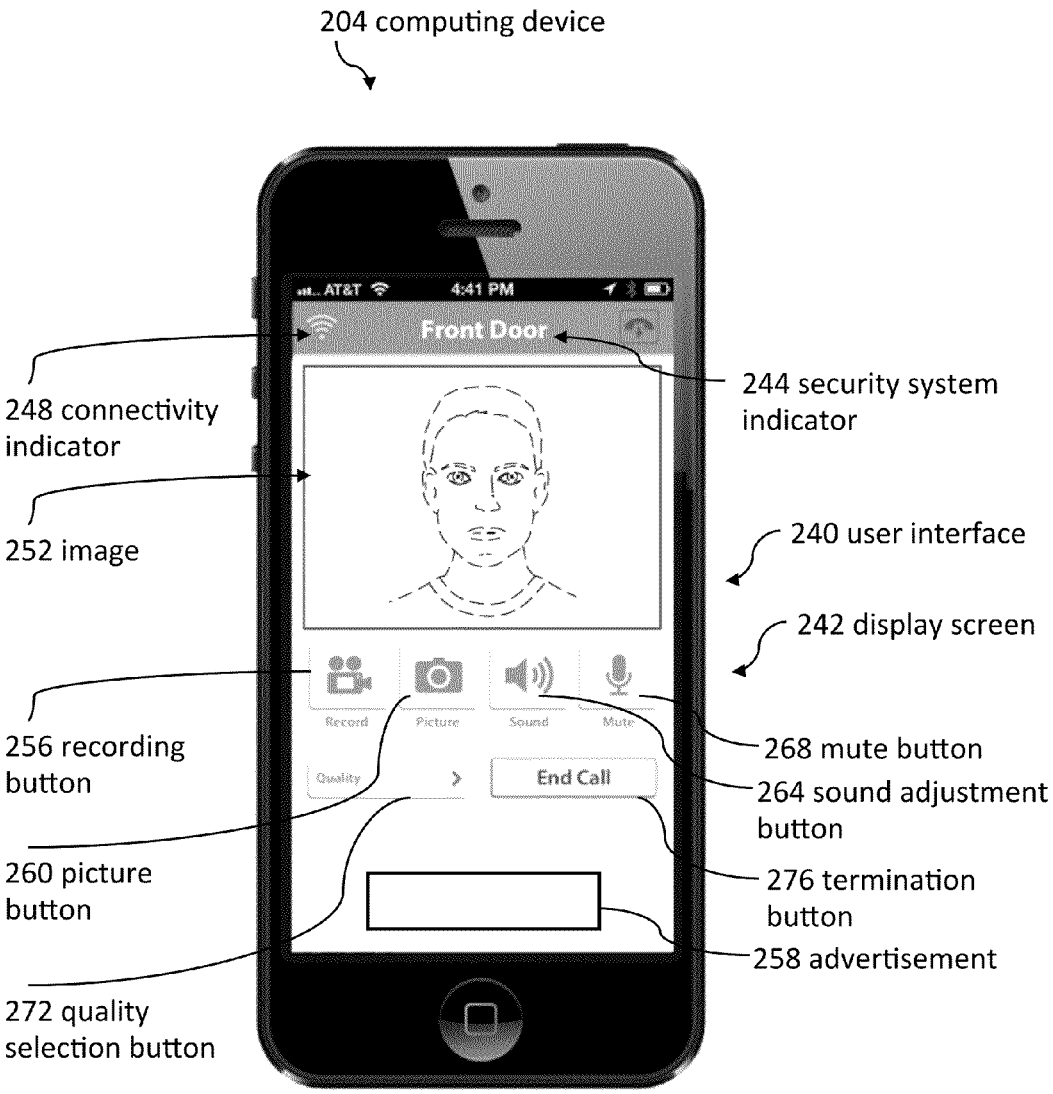
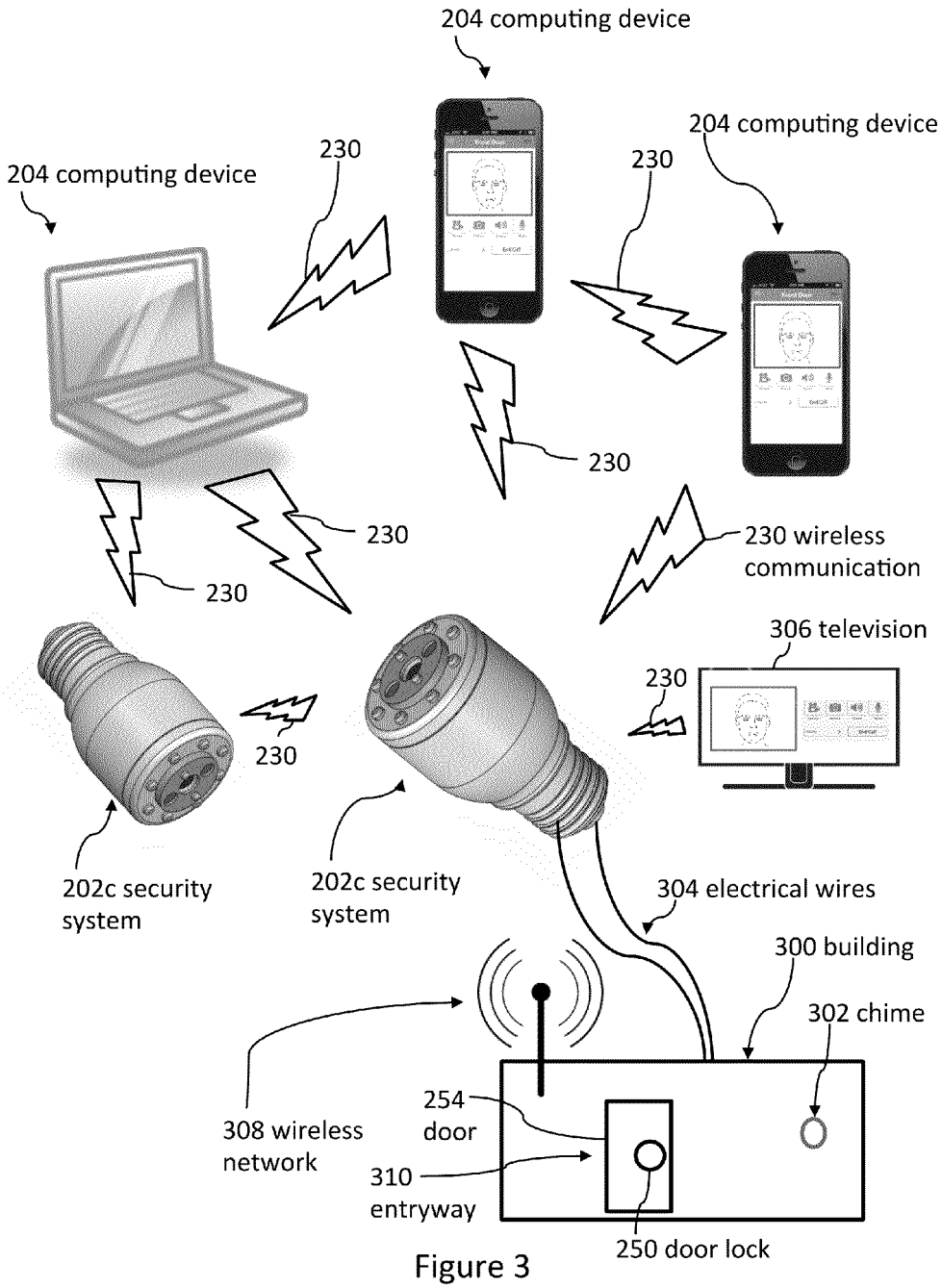

204 computing device
AT&T
4:41 PM
Front Door
248 connectivity indicator
252 image
244 security system indicator
240 user interface
242 display screen
256 recording button
260 picture button
272 quality selection button
Record
Picture
Sound
Mute
Quality
End Call
268 mute button
264 sound adjustment button
276 termination button
258 advertisement

**Figure 2**


204 computing device
204 computing device
204 computing device
230
230
230
230
230
230
230 wireless communication
306 television
230
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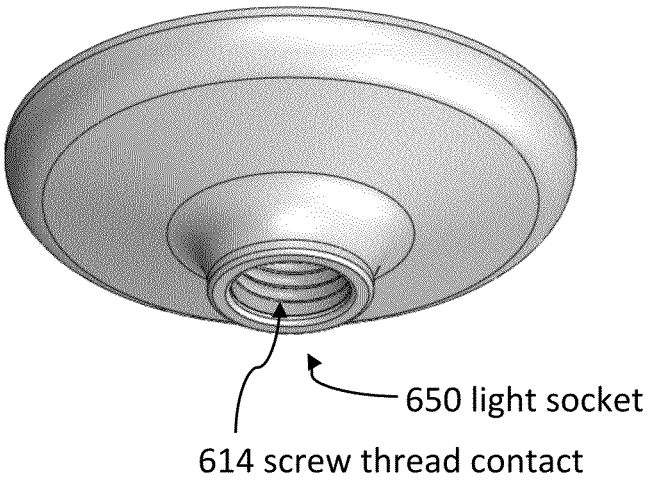
202c security system
202c security system
304 electrical wires
300 building
302 chime
308 wireless network
254 door
310 entryway
250 door lock

Figure 3

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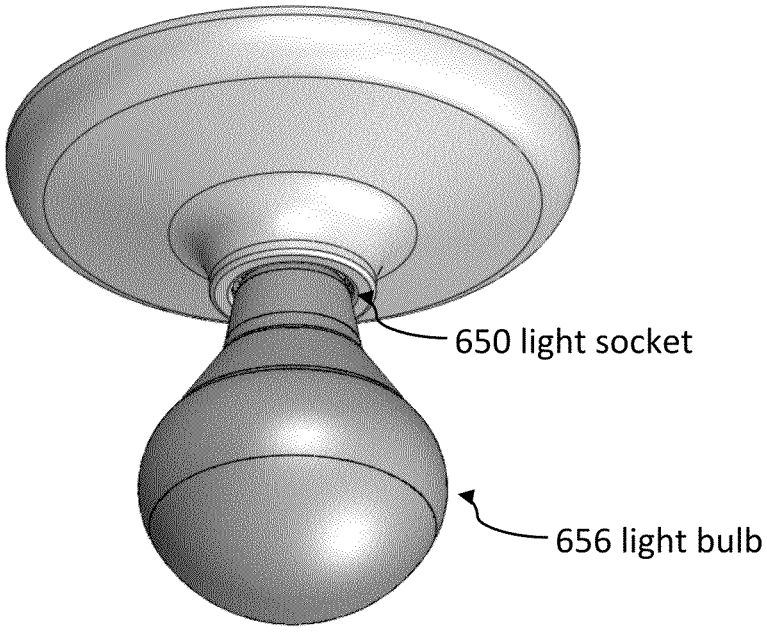


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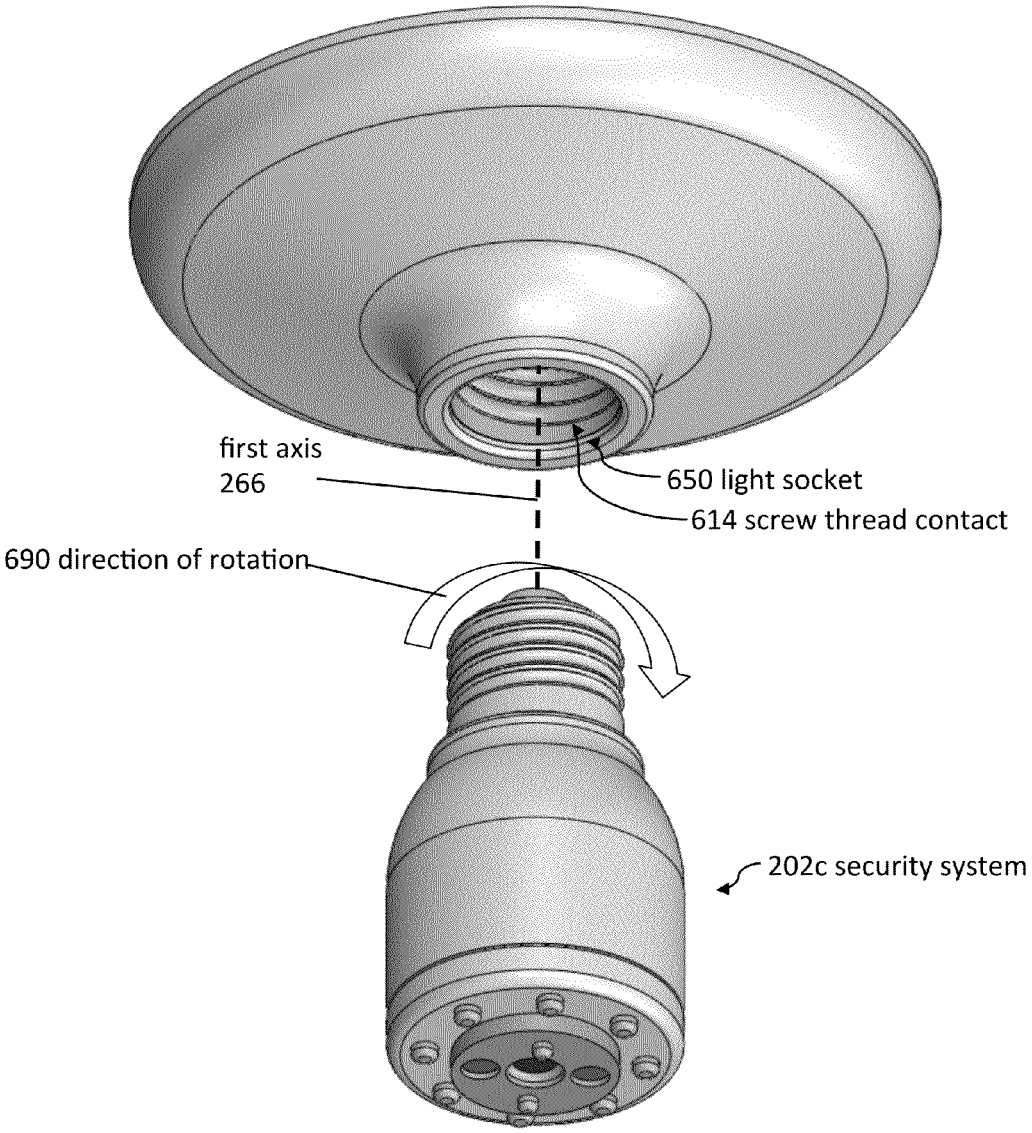

first axis
266
650 light socket
614 screw thread contact
690 direction of rotation
202c security system

Figure 6


**Figure 7**

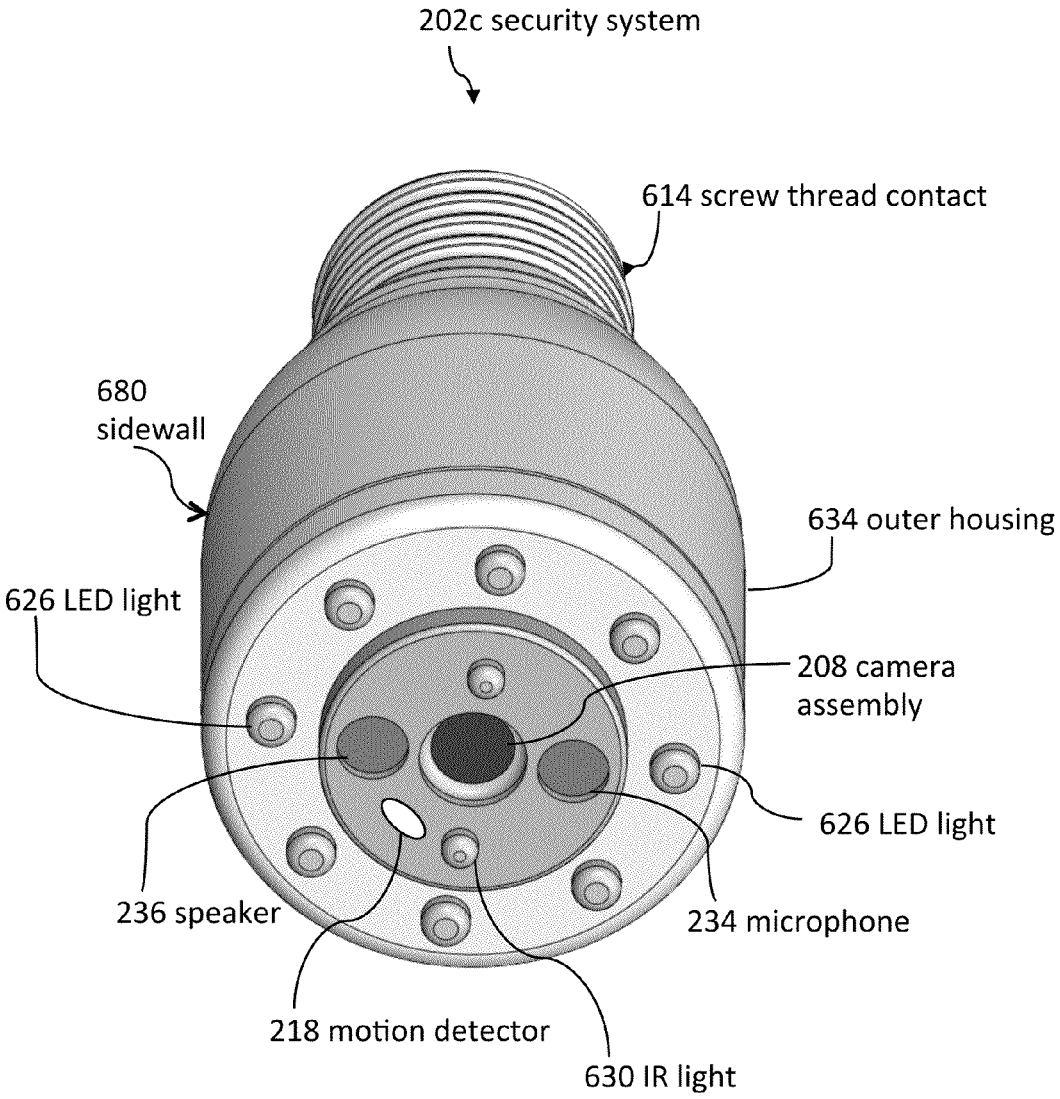

202c security system
614 screw thread contact
680
sidewall
634 outer housing
626 LED light
208 camera
assembly
626 LED light
236 speaker
234 microphone
218 motion detector
630 IR light

**Figure 8**

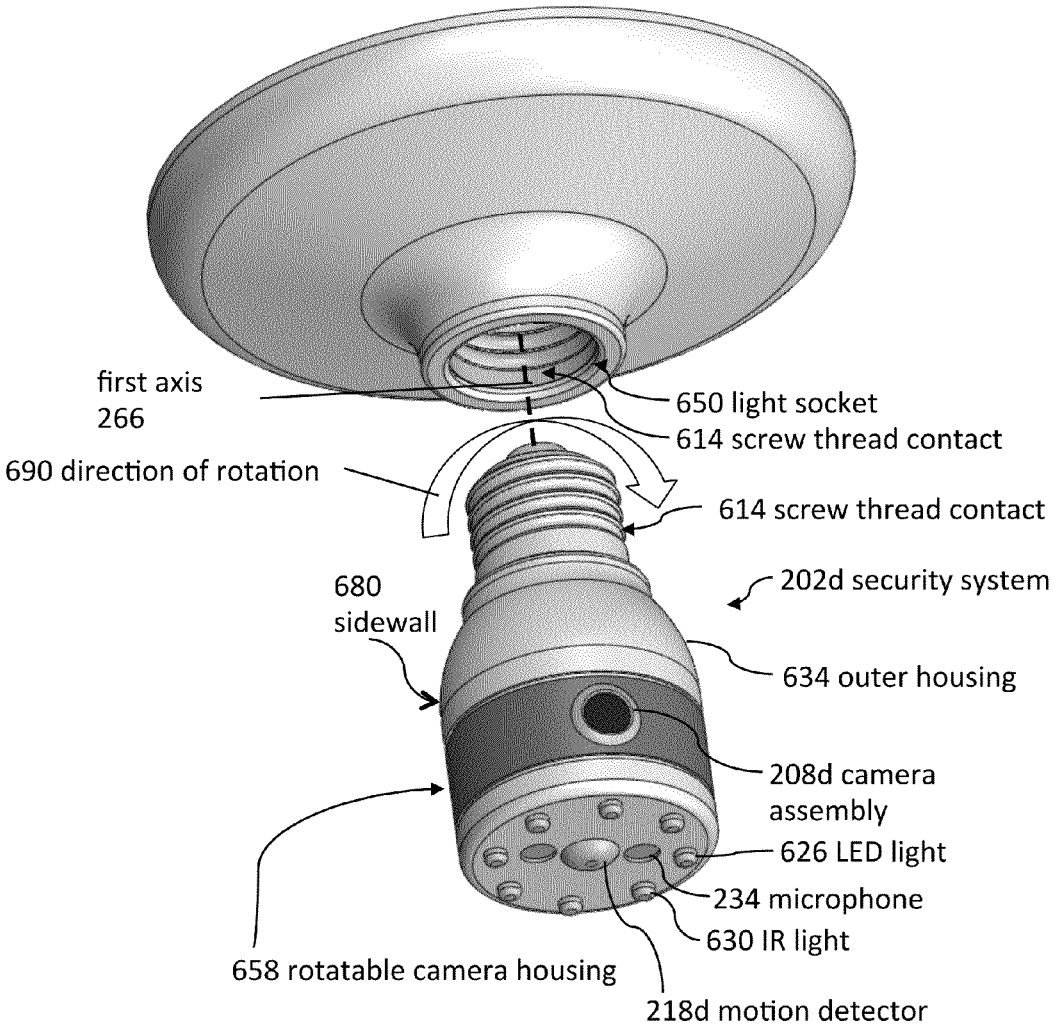
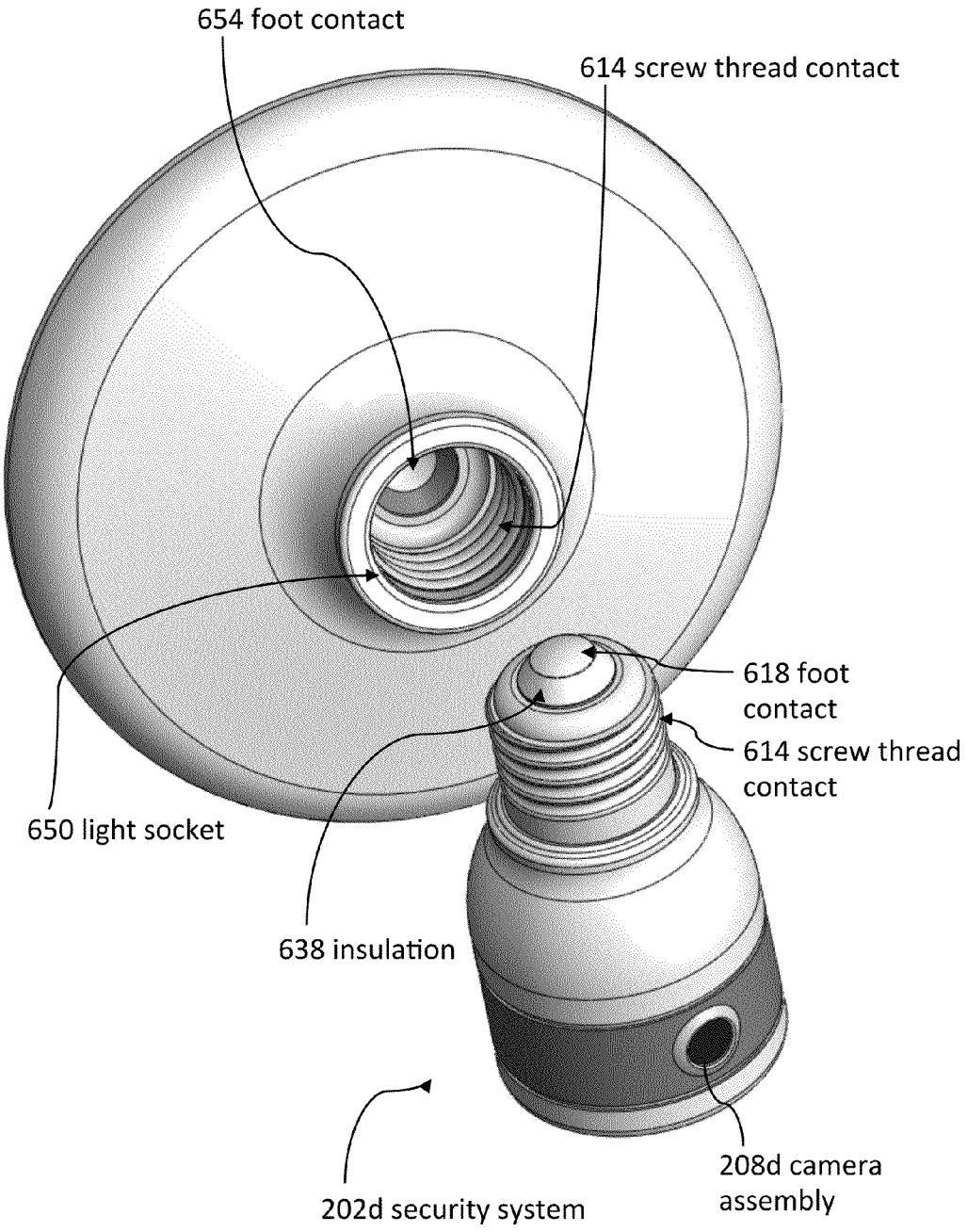

first axis
266
650 light socket
614 screw thread contact
690 direction of rotation
614 screw thread contact
680
sidewall
202d security system
634 outer housing
208d camera
assembly
626 LED light
234 microphone
630 IR light
658 rotatable camera housing
218d motion detector

**Figure 9**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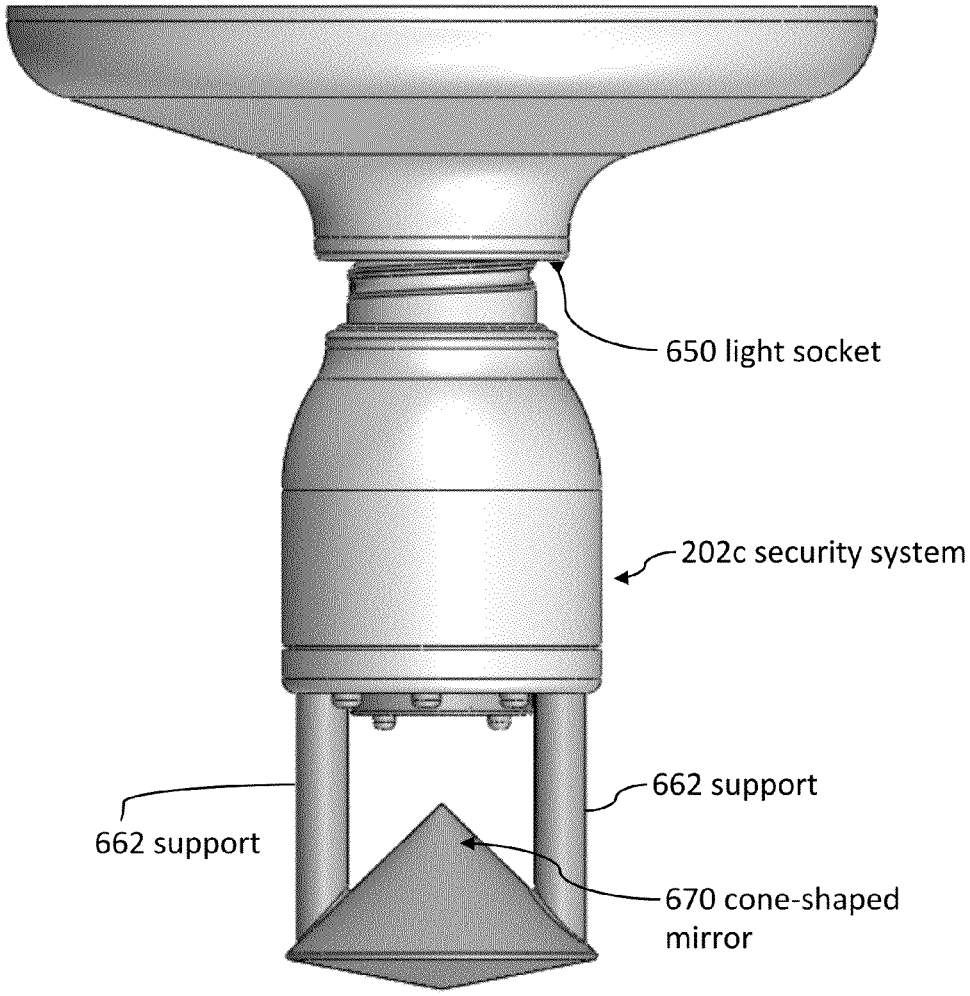
614 screw thread contact
618 foot contact
614 screw thread contact
650 light socket
638 insulation
208d camera assembly
202d security system

**Figure 10**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202c security system
662 support
662 support
670 cone-shaped mirror

**Figure 11**

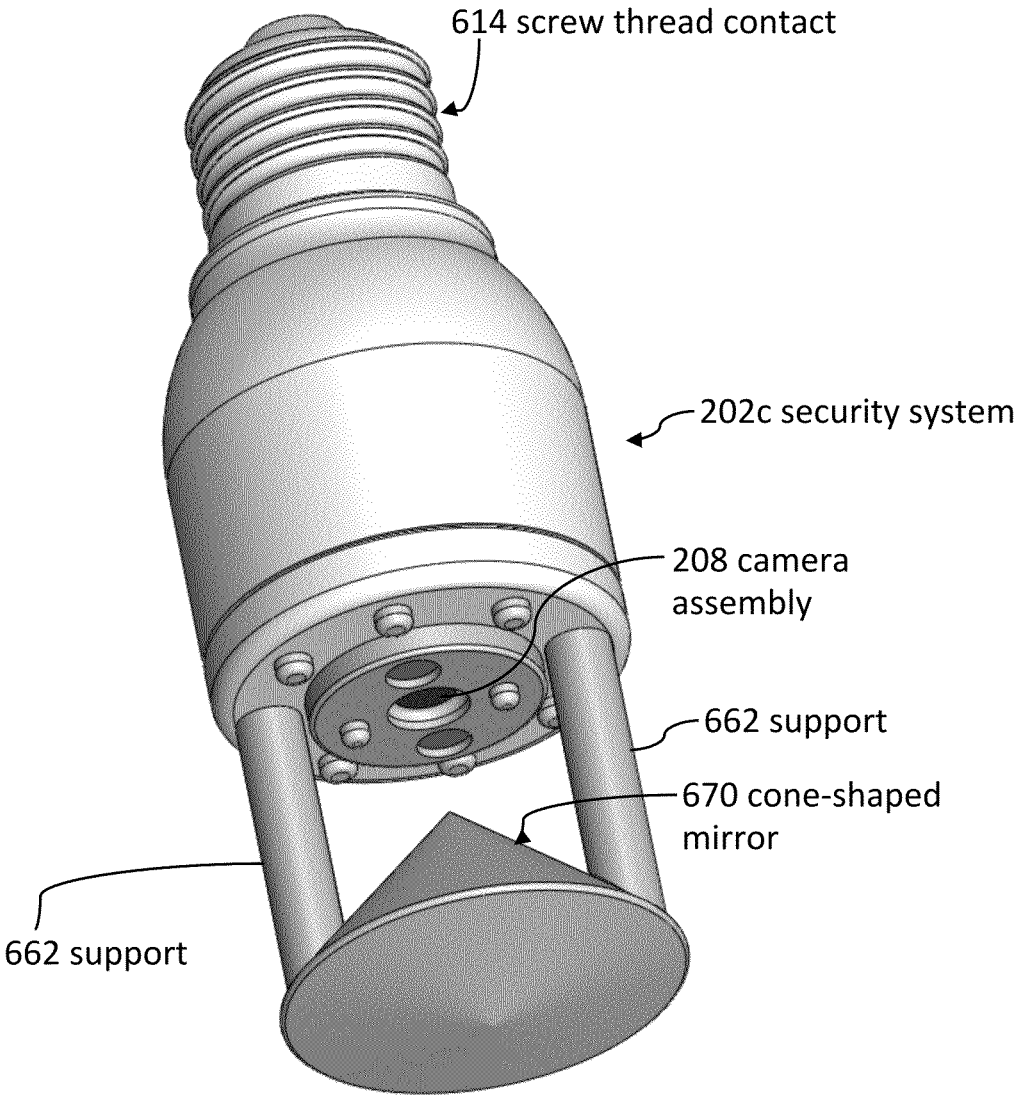
614 screw thread contact
202c security system
208 camera assembly
662 support
670 cone-shaped mirror
662 support

**Figure 12**

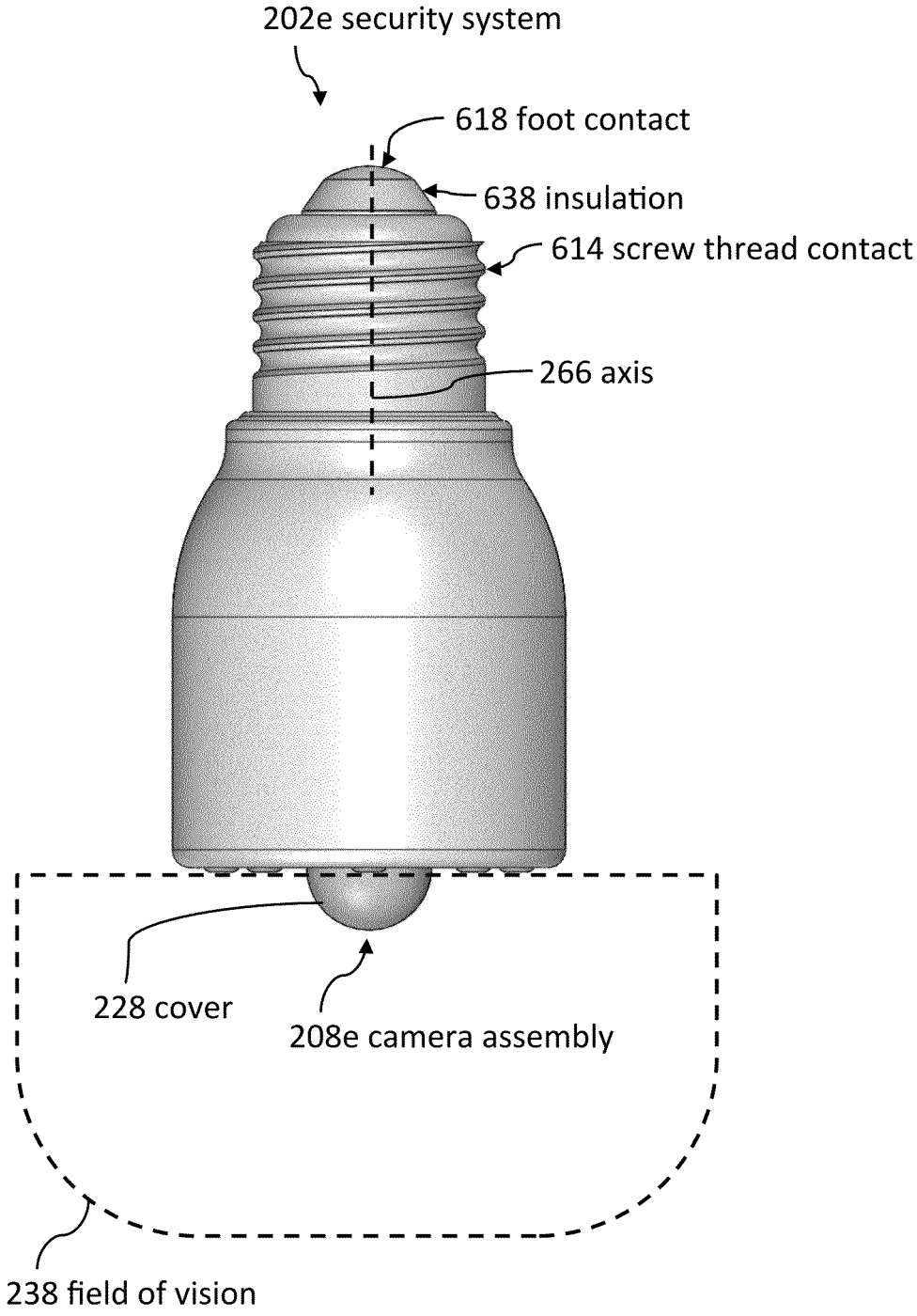
202e security system
618 foot contact
638 insulation
614 screw thread contact
266 axis
228 cover
208e camera assembly
238 field of vision

Figure 13a

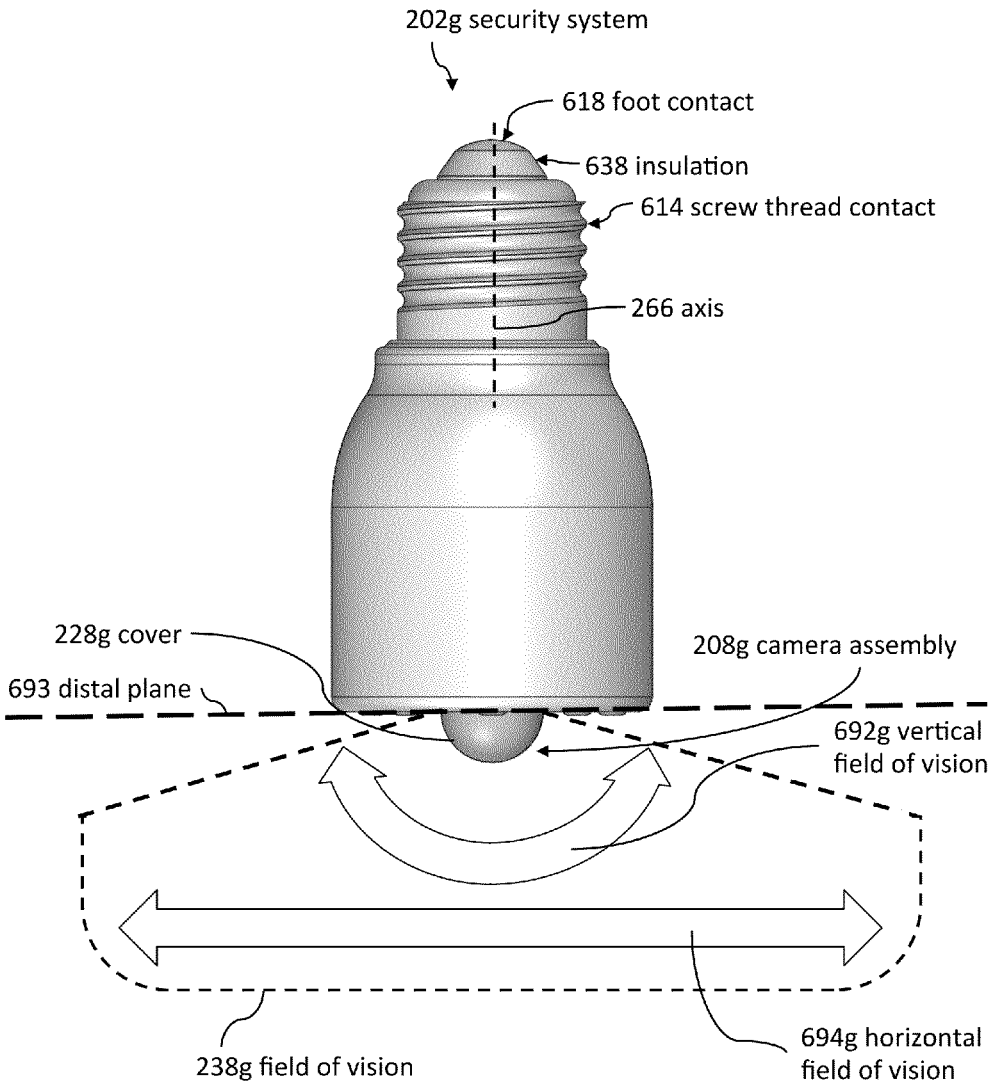
202g security system
618 foot contact
638 insulation
614 screw thread contact
266 axis
228g cover
693 distal plane
208g camera assembly
692g vertical field of vision
238g field of vision
694g horizontal field of vision

**Figure 13b**

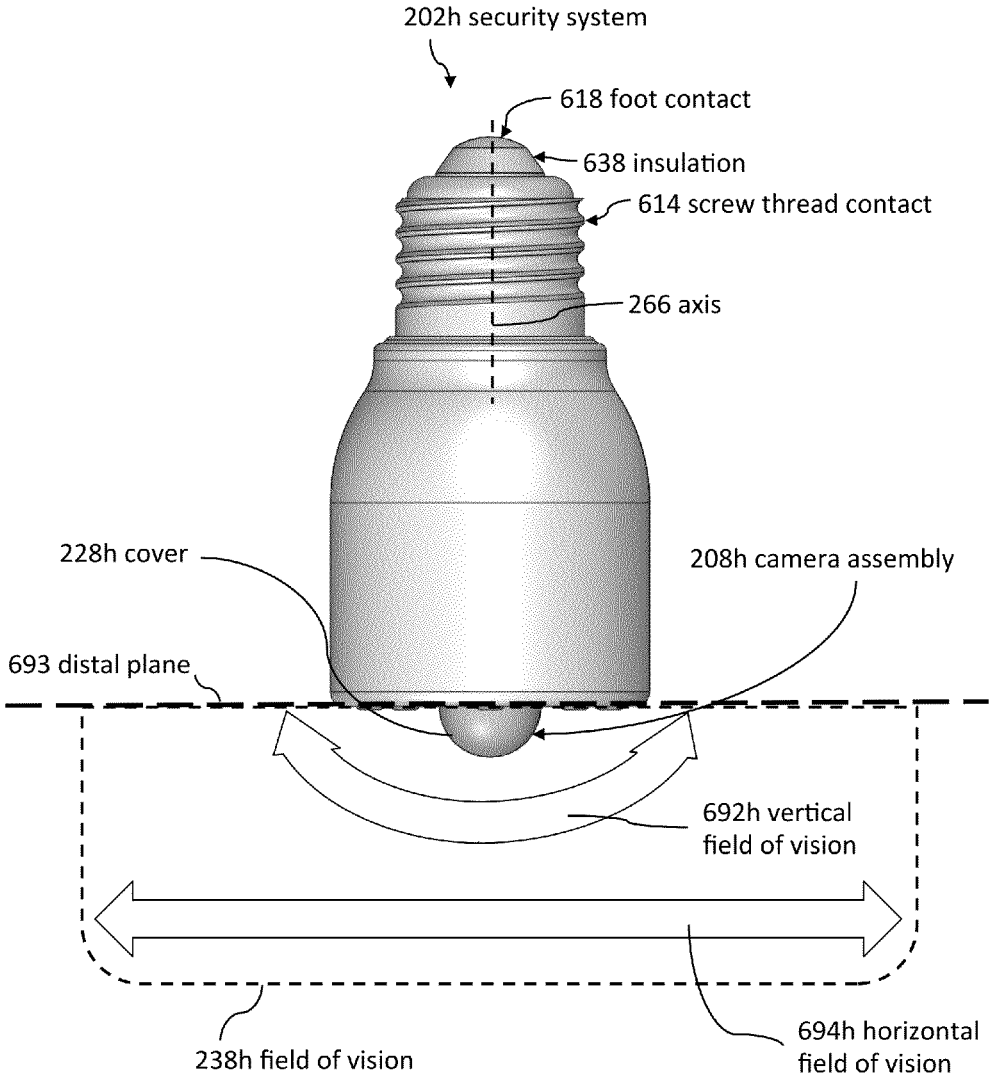
202h security system
618 foot contact
638 insulation
614 screw thread contact
266 axis
228h cover
208h camera assembly
693 distal plane
692h vertical field of vision
694h horizontal field of vision
238h field of vision

**Figure 13c**

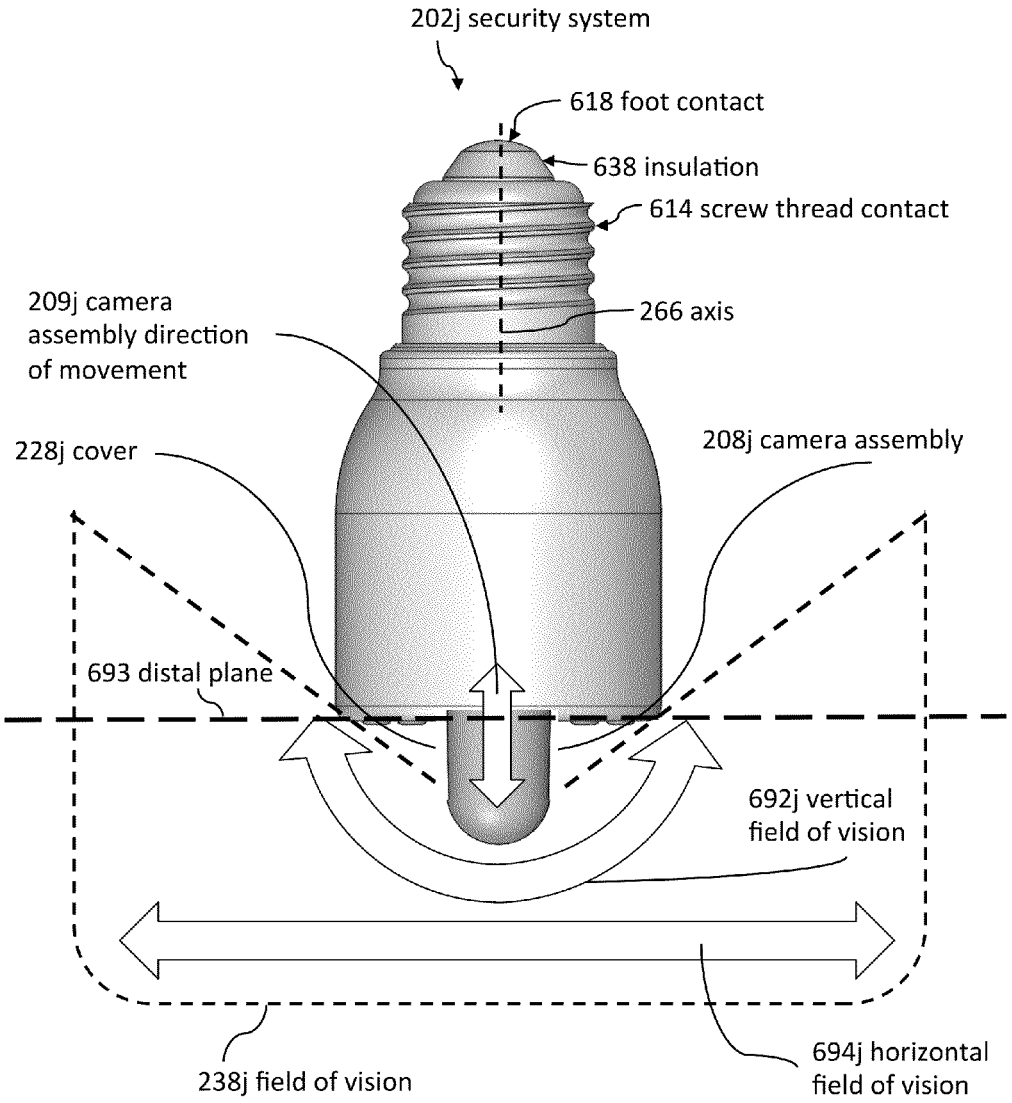
202j security system
618 foot contact
638 insulation
614 screw thread contact
209j camera assembly direction of movement
266 axis
228j cover
208j camera assembly
693 distal plane
692j vertical field of vision
694j horizontal field of vision
238j field of vision

**Figure 13d**

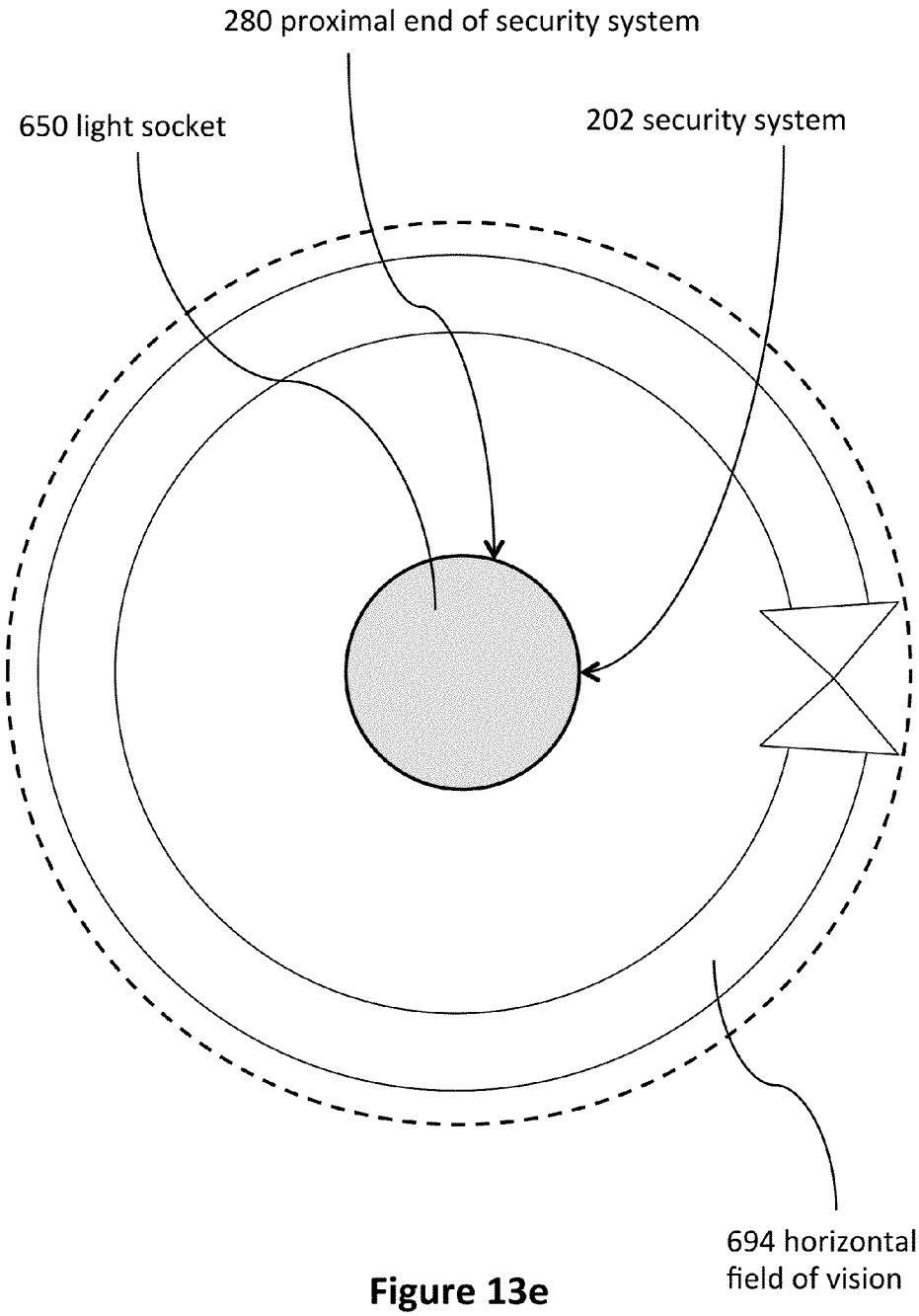
280 proximal end of security system
650 light socket
202 security system
694 horizontal field of vision

Figure 13e

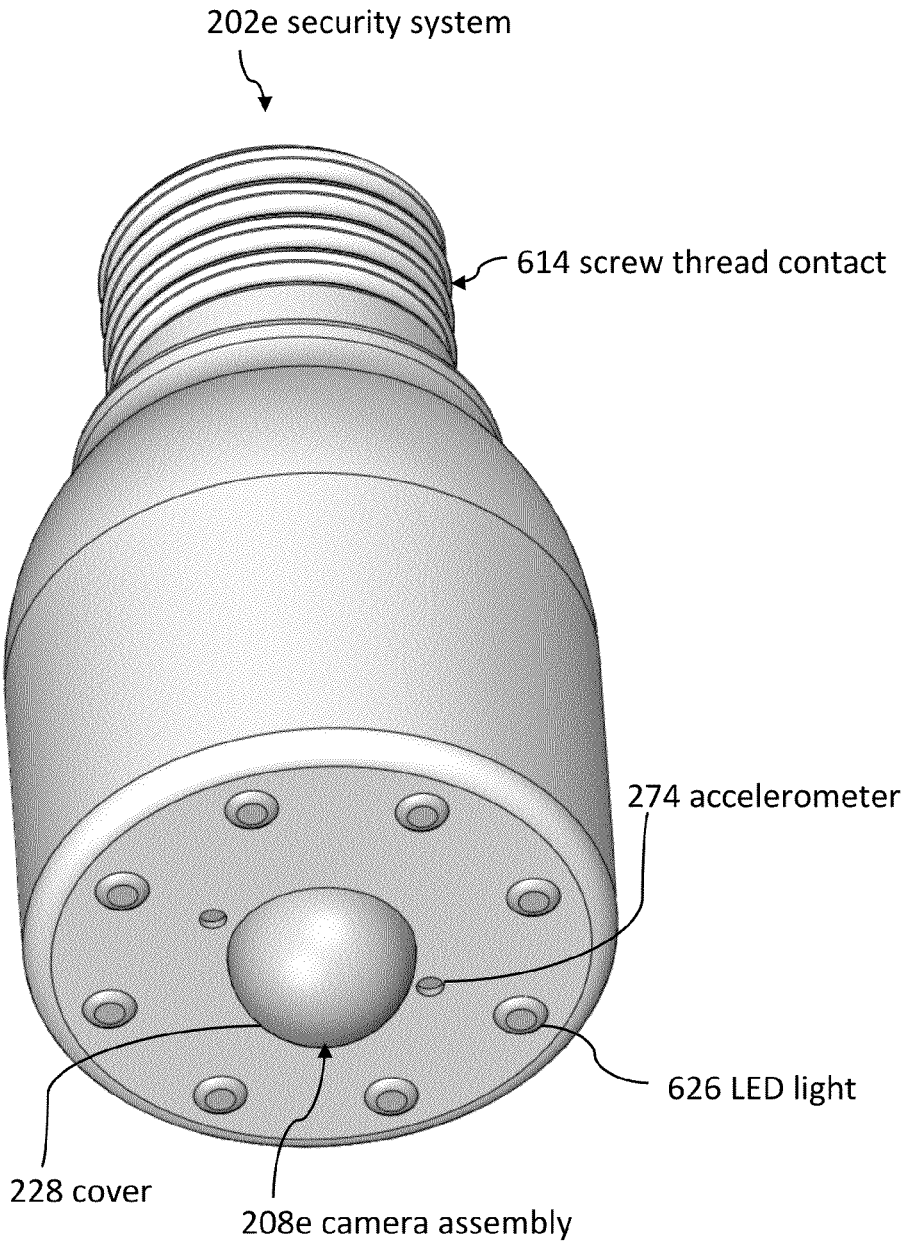
202e security system
614 screw thread contact
274 accelerometer
626 LED light
228 cover
208e camera assembly

**Figure 14**

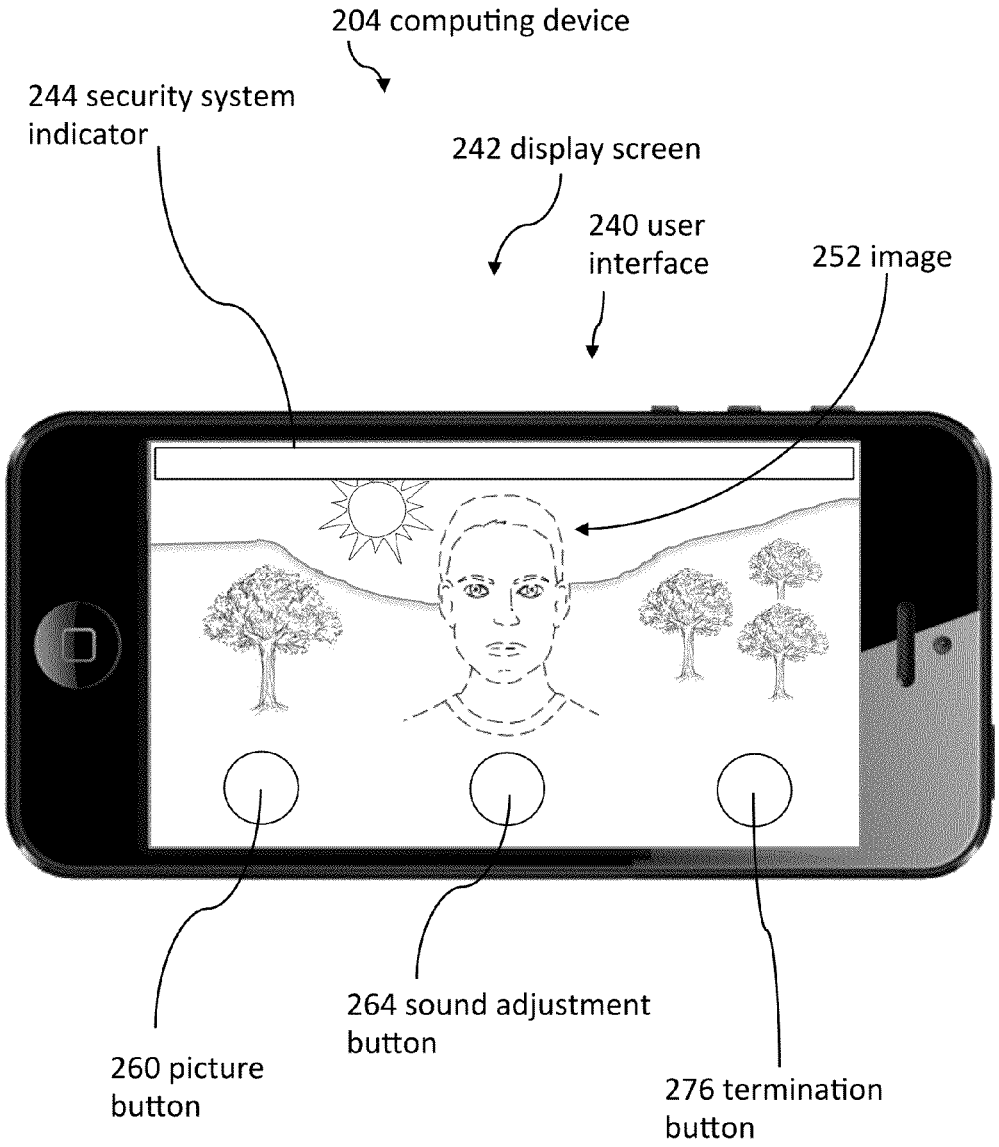
204 computing device
244 security system indicator
242 display screen
240 user interface
252 image
260 picture button
264 sound adjustment button
276 termination button

**Figure 15**

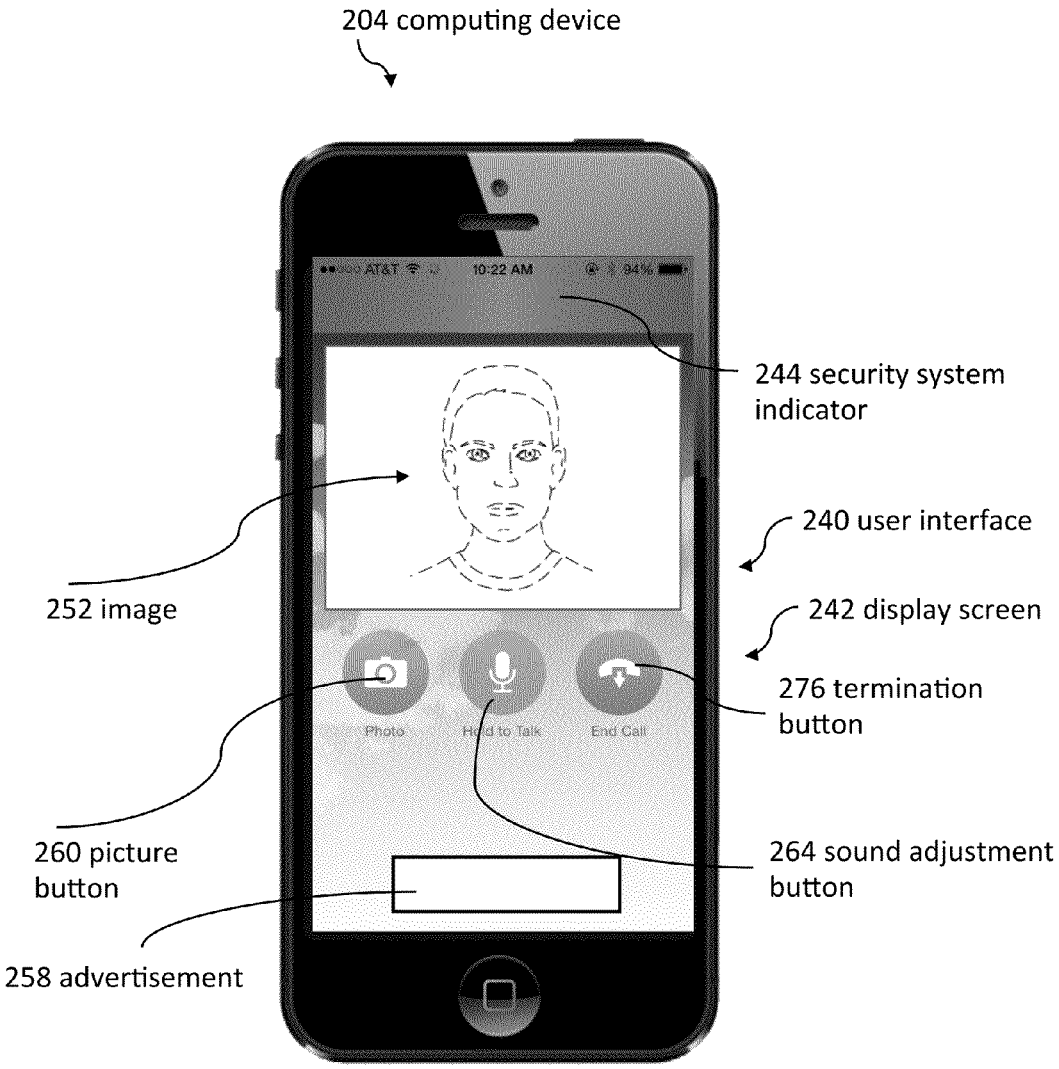
204 computing device
244 security system indicator
240 user interface
242 display screen
252 image
276 termination button
260 picture button
264 sound adjustment button
258 advertisement
AT&T
10:22 AM
94%
Photo
Hold to Talk
End Call

**Figure 16**

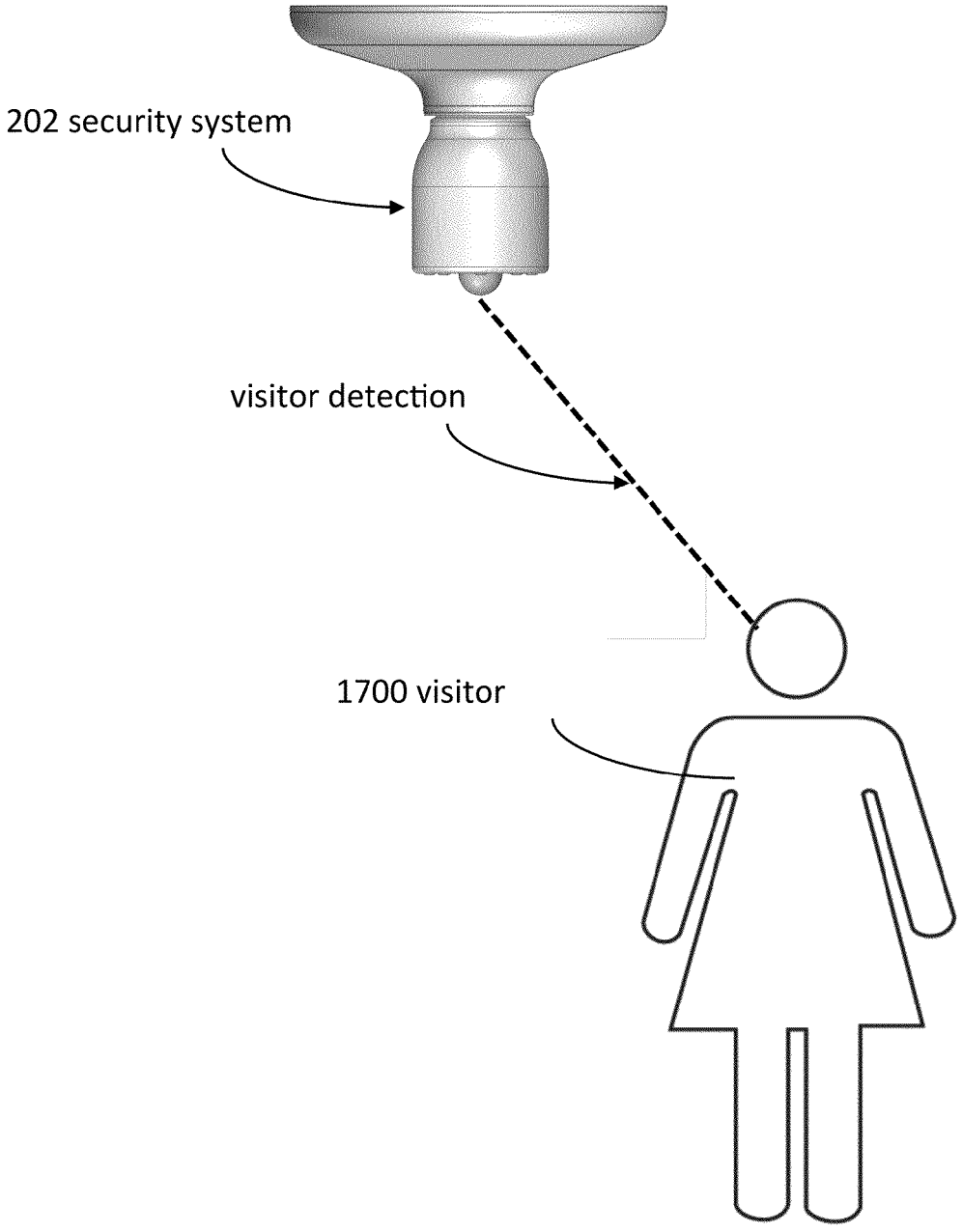


Figure 17

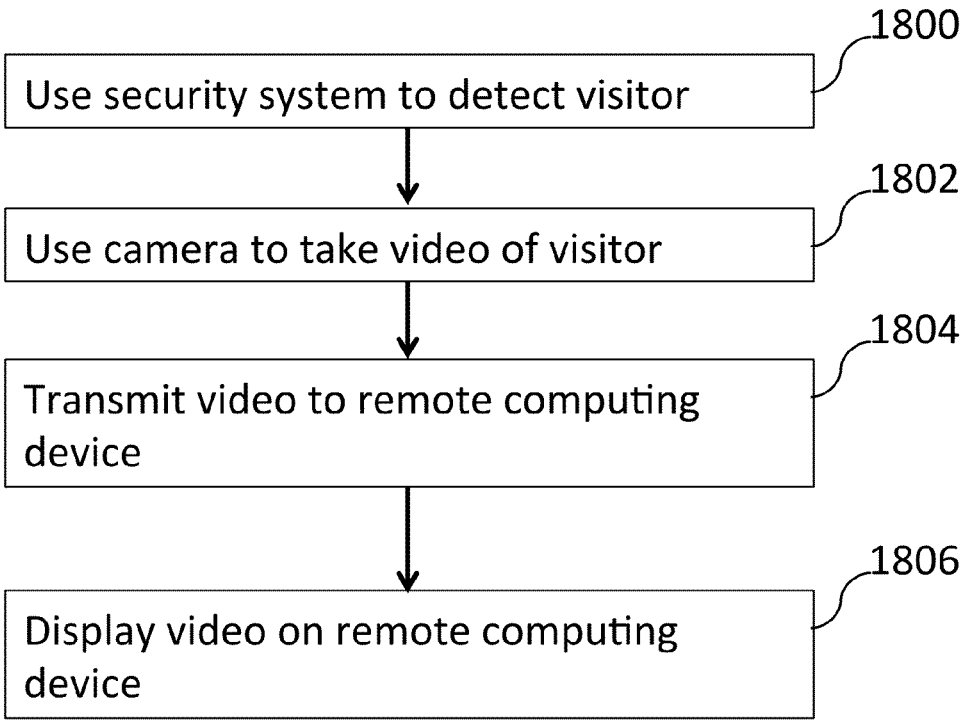


**Figure 18**

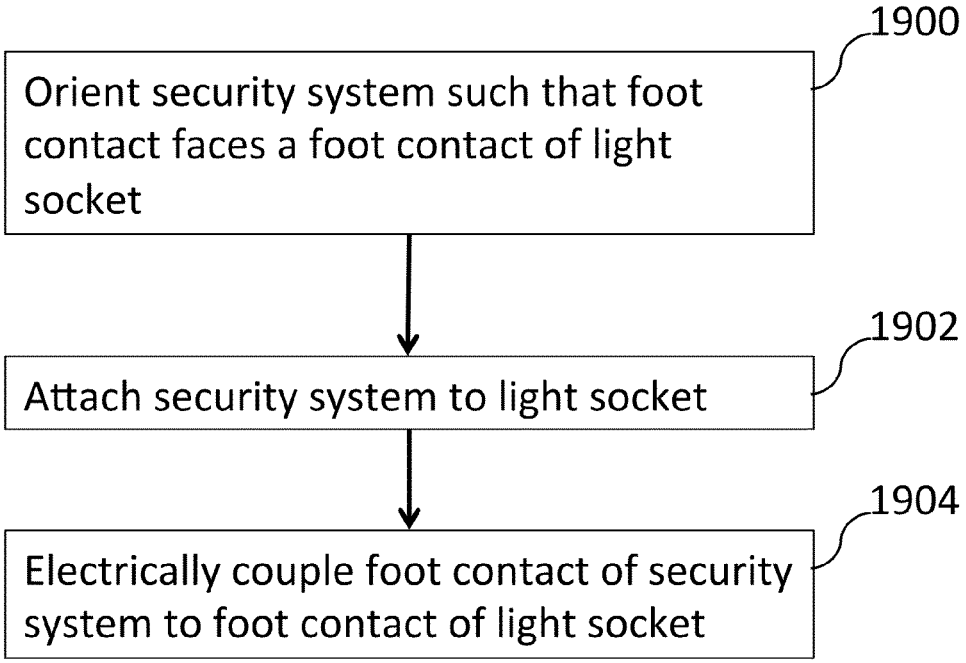


**Figure 19**

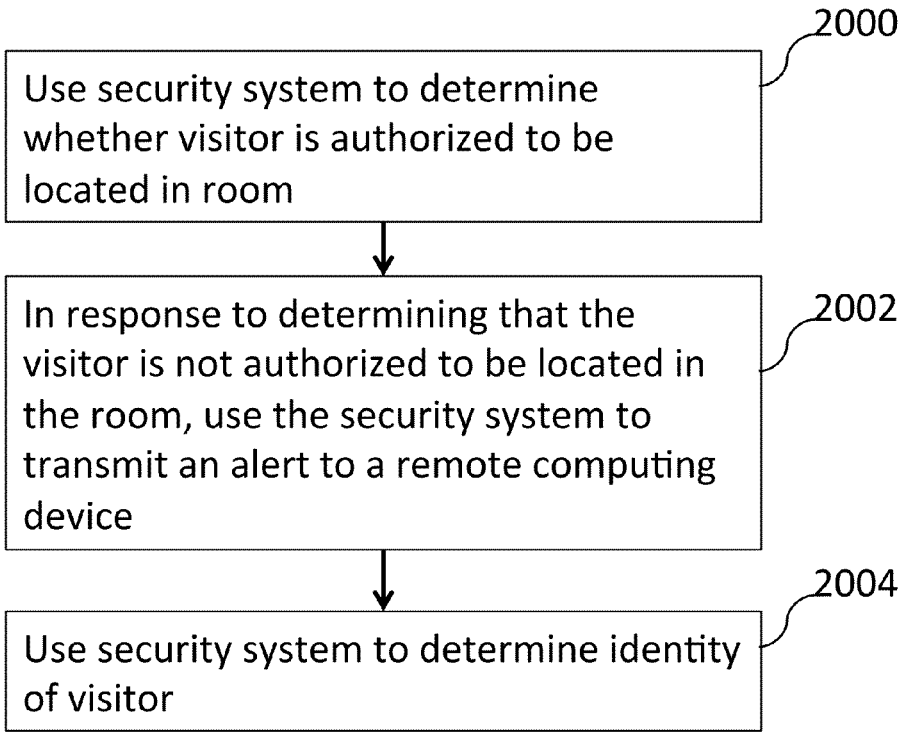


**Figure 20**

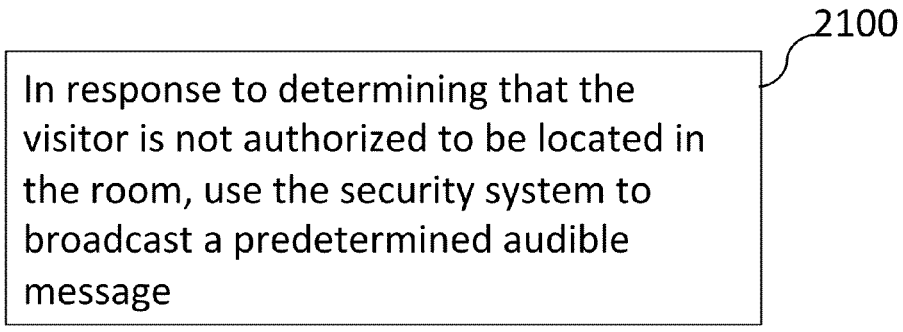


**Figure 21**

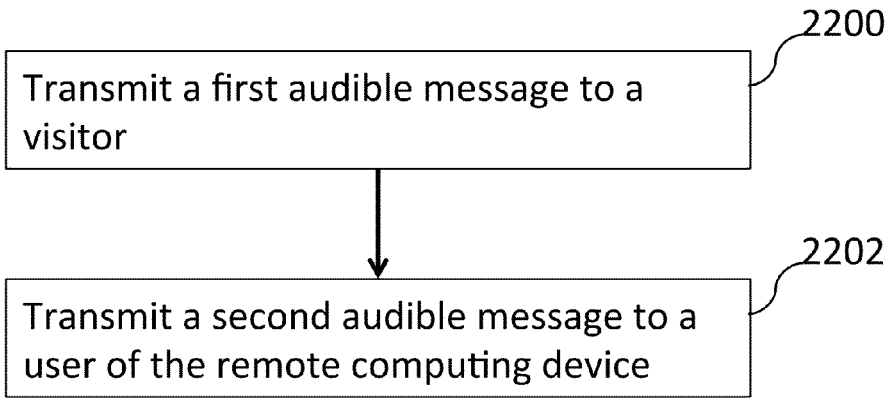


**Figure 22**

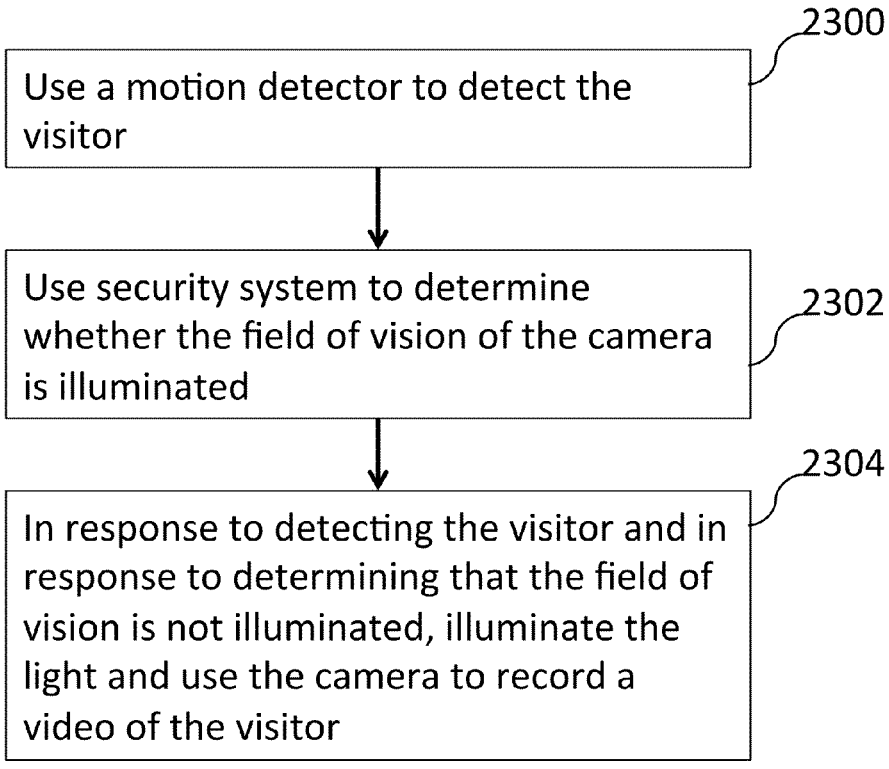


**Figure 23**

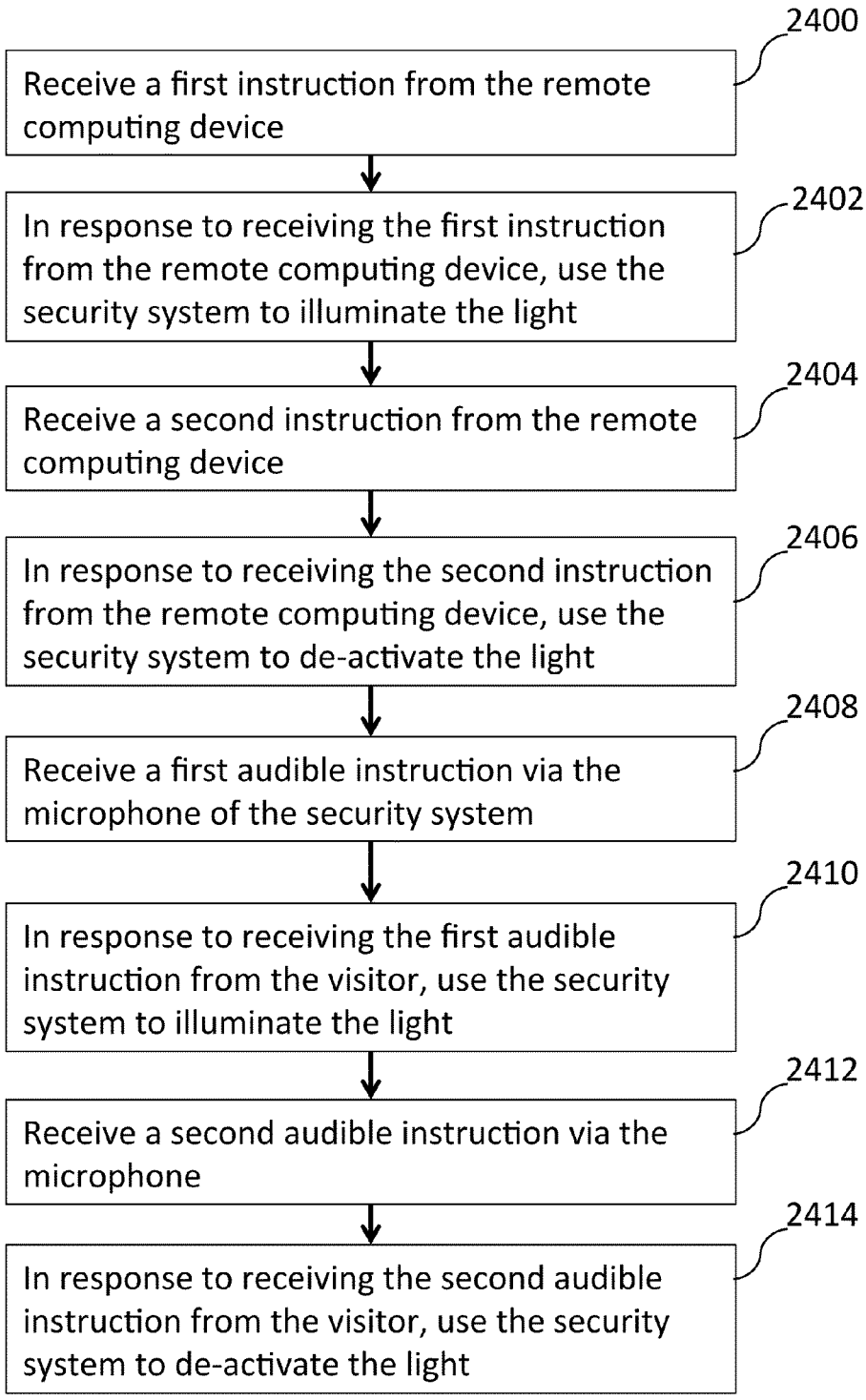
2400
Receive a first instruction from the remote computing device
2402
In response to receiving the first instruction from the remote computing device, use the security system to illuminate the light
2404
Receive a second instruction from the remote computing device
2406
In response to receiving the second instruction from the remote computing device, use the security system to de-activate the light
2408
Receive a first audible instruction via the microphone of the security system
2410
In response to receiving the first audible instruction from the visitor, use the security system to illuminate the light
2412
Receive a second audible instruction via the microphone
2414
In response to receiving the second audible instruction from the visitor, use the security system to de-activate the light

**Figure 24**

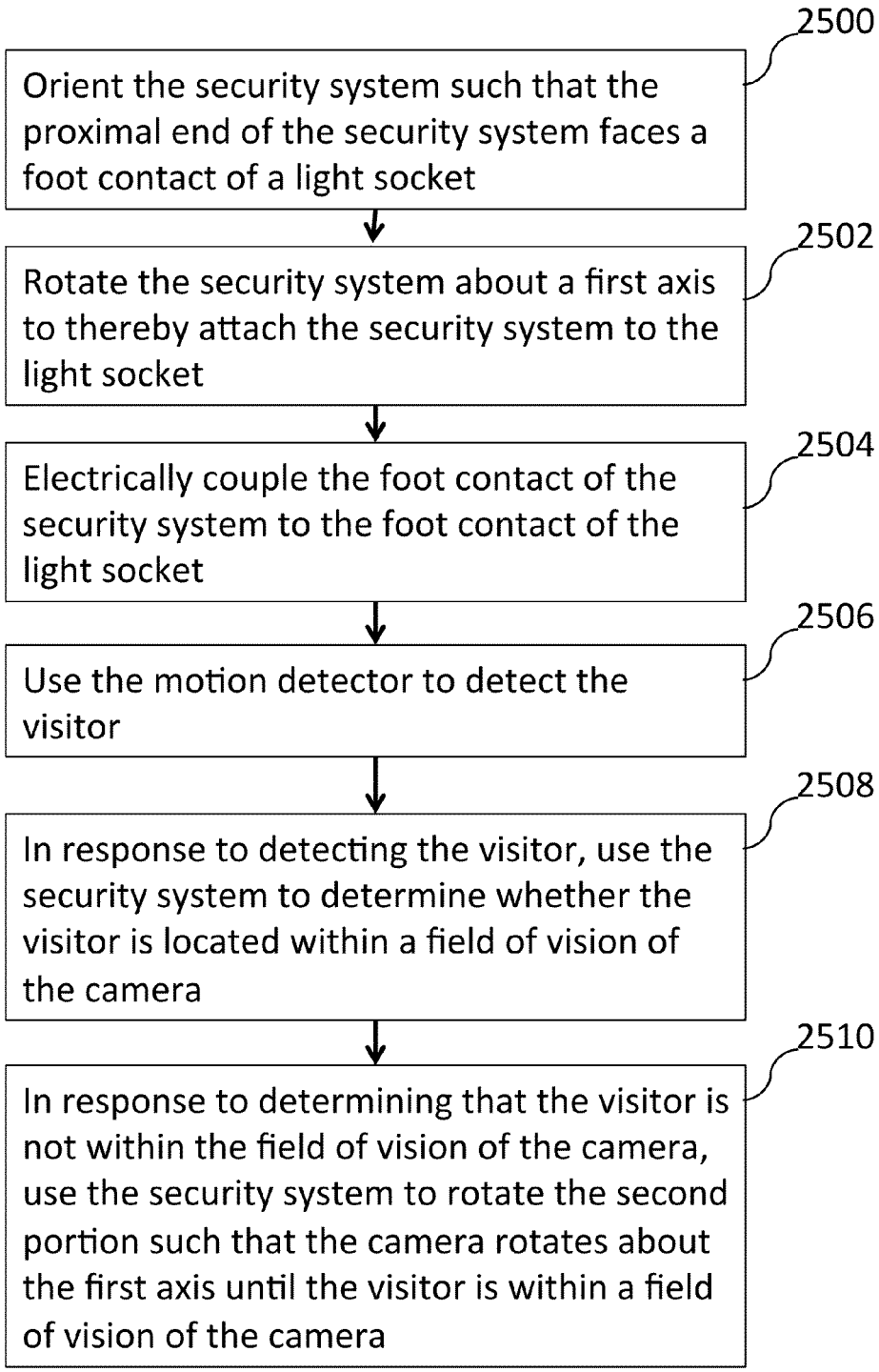
2500
Orient the security system such that the proximal end of the security system faces a foot contact of a light socket
2502
Rotate the security system about a first axis to thereby attach the security system to the light socket
2504
Electrically couple the foot contact of the security system to the foot contact of the light socket
2506
Use the motion detector to detect the visitor
2508
In response to detecting the visitor, use the security system to determine whether the visitor is located within a field of vision of the camera
2510
In response to determining that the visitor is not within the field of vision of the camera, use the security system to rotate the second portion such that the camera rotates about the first axis until the visitor is within a field of vision of the camera

**Figure 25**

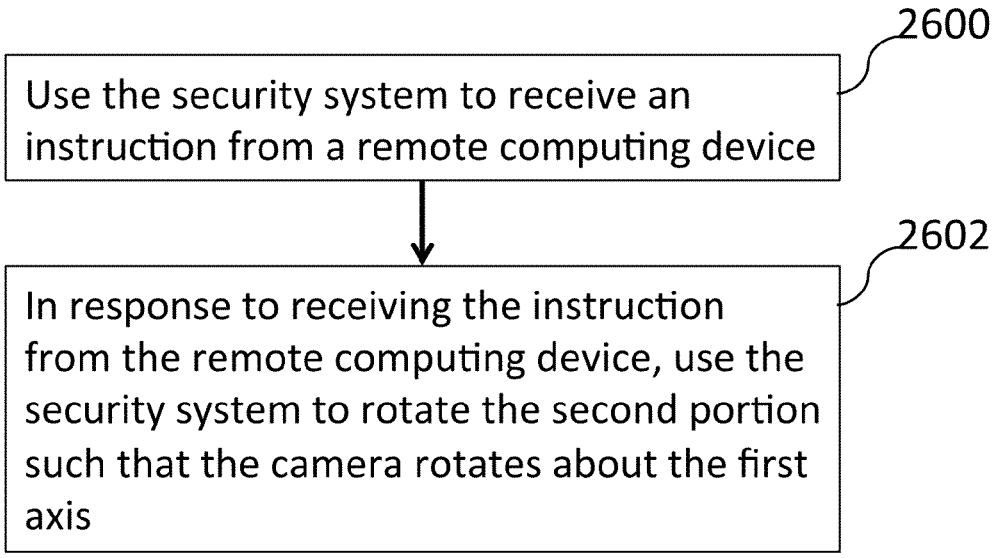


**Figure 26**

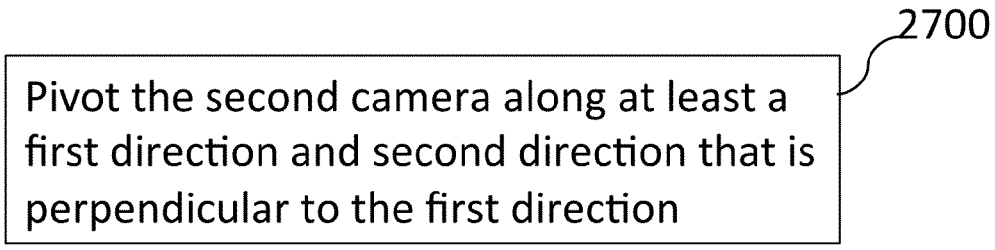


**Figure 27**

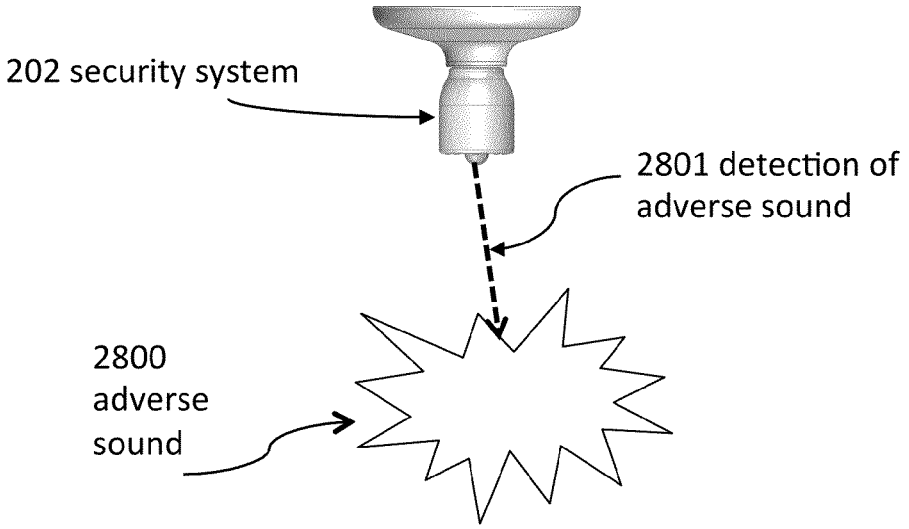


Figure 28a

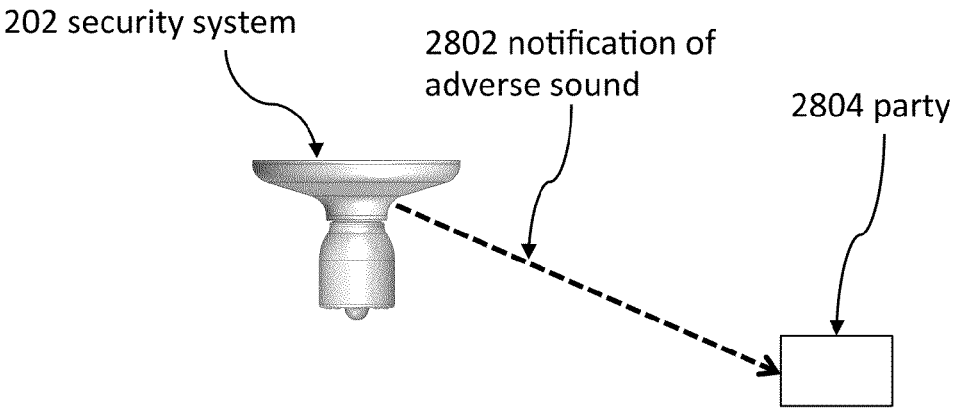


Figure 28b

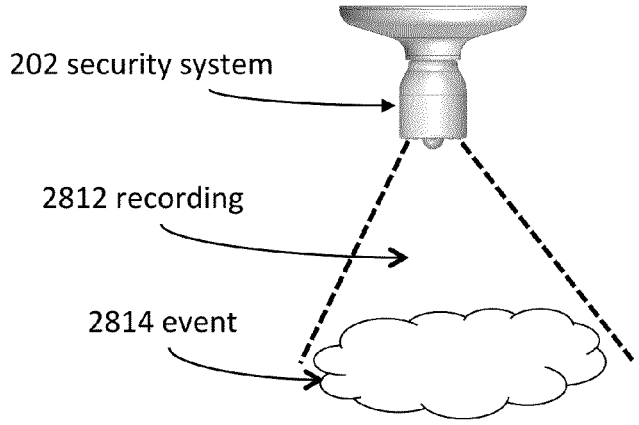


Figure 28c

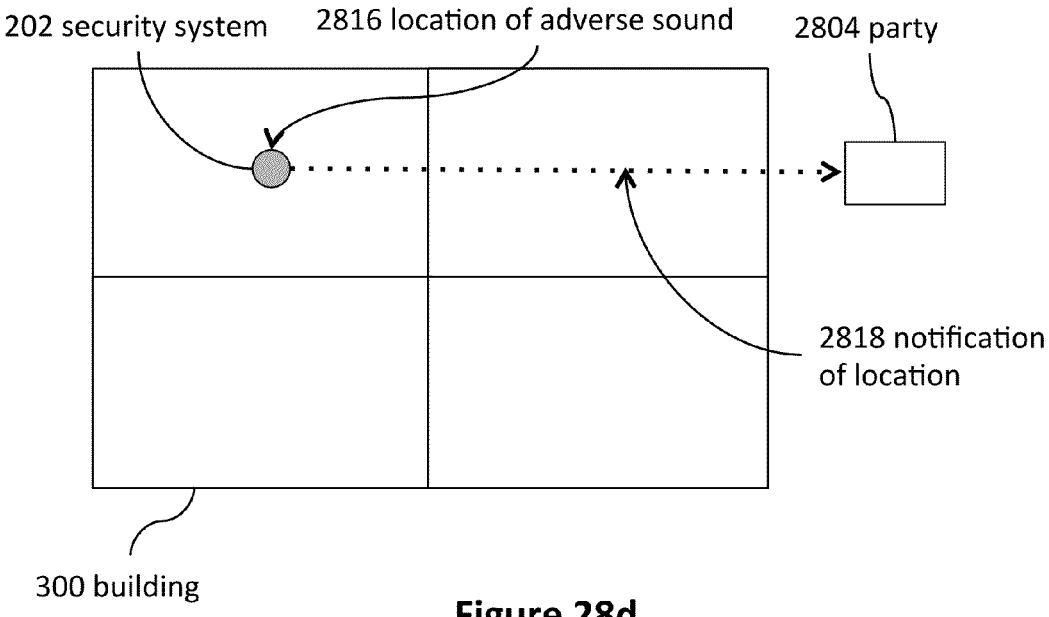


Figure 28d

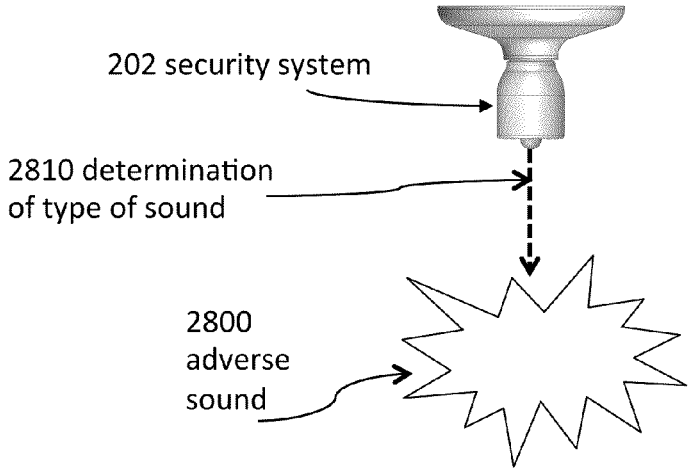


**Figure 28e**

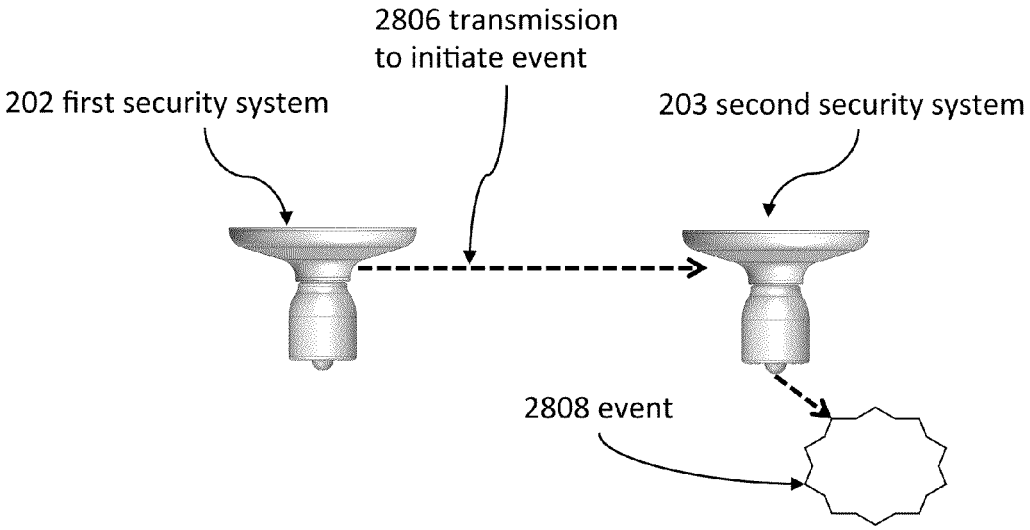


**Figure 28f**

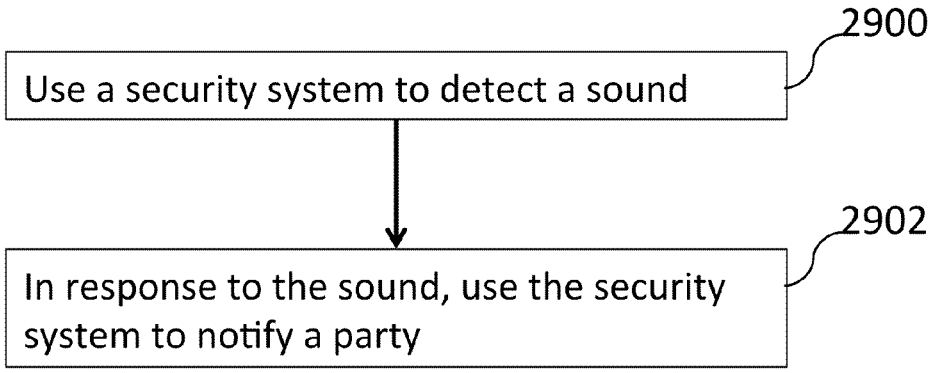


**Figure 29**

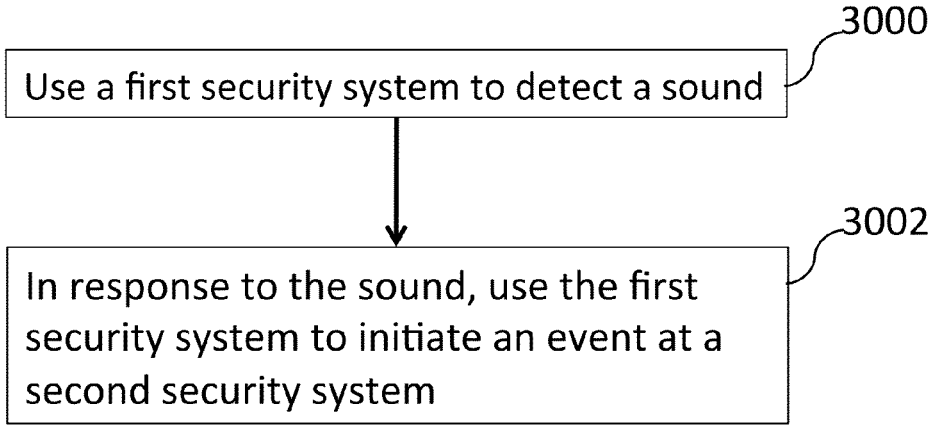


**Figure 30**

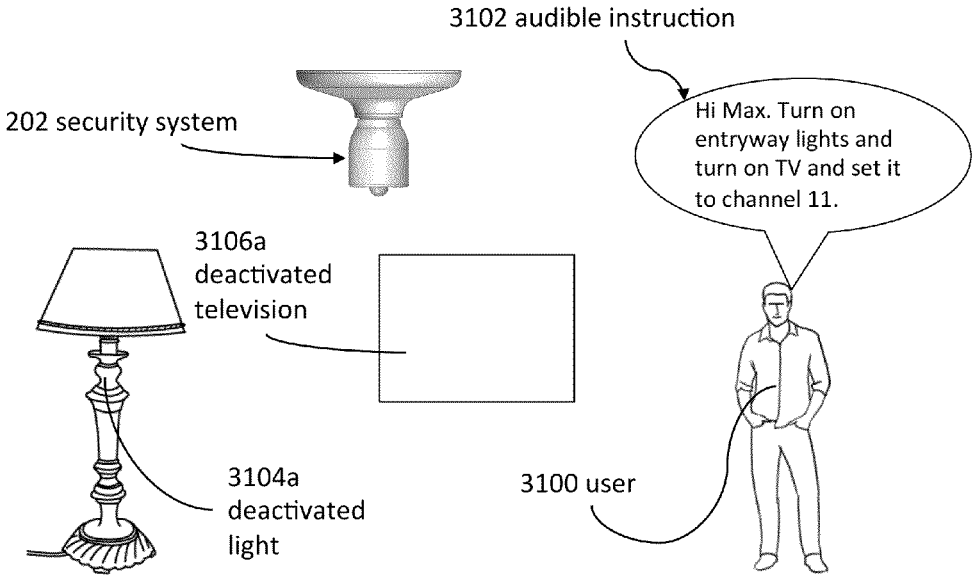


Figure 31a

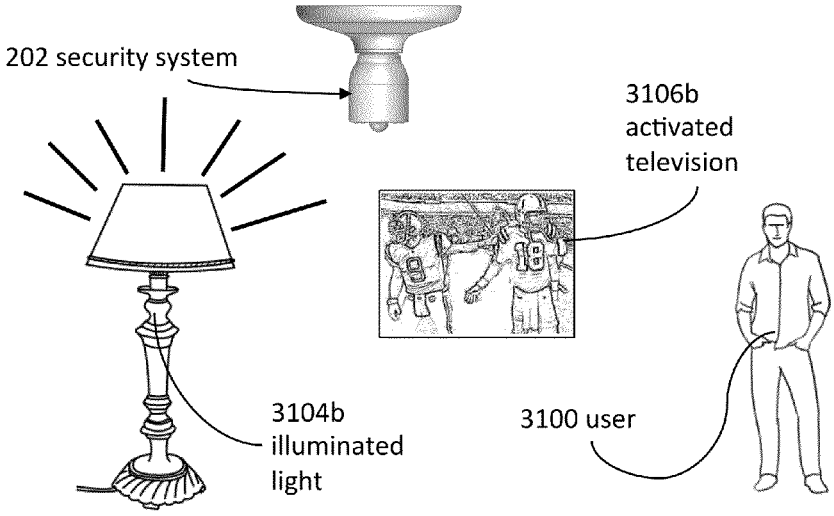


Figure 31b

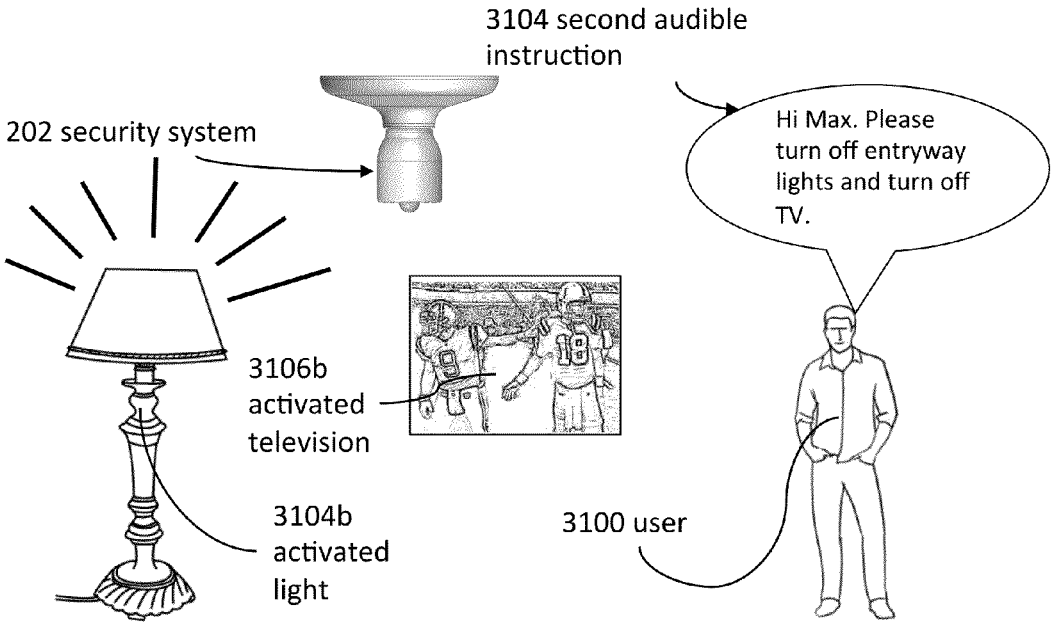


Figure 31c

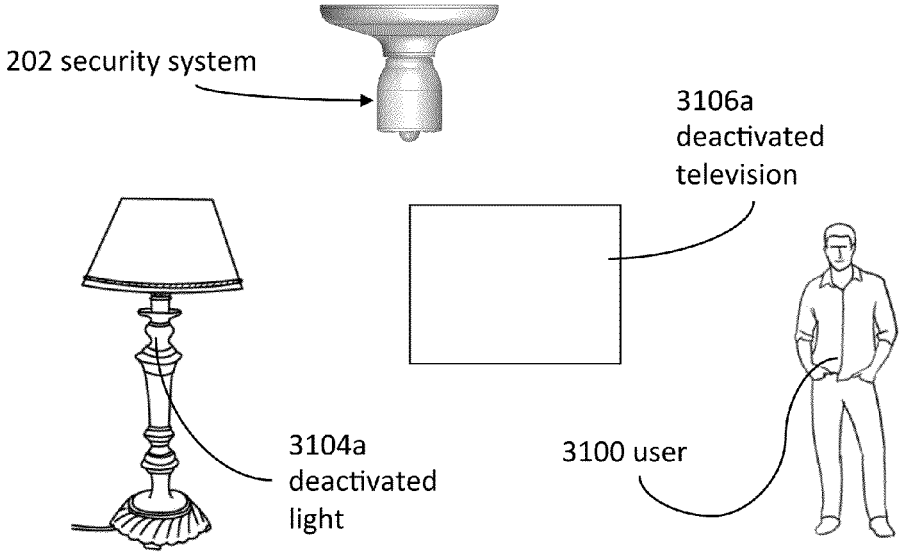


Figure 31d

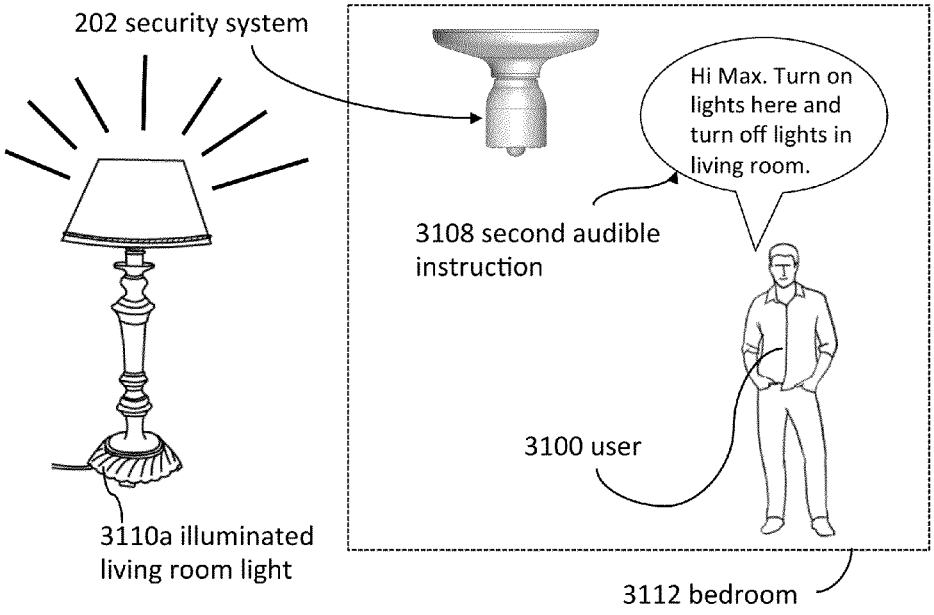


Figure 31e

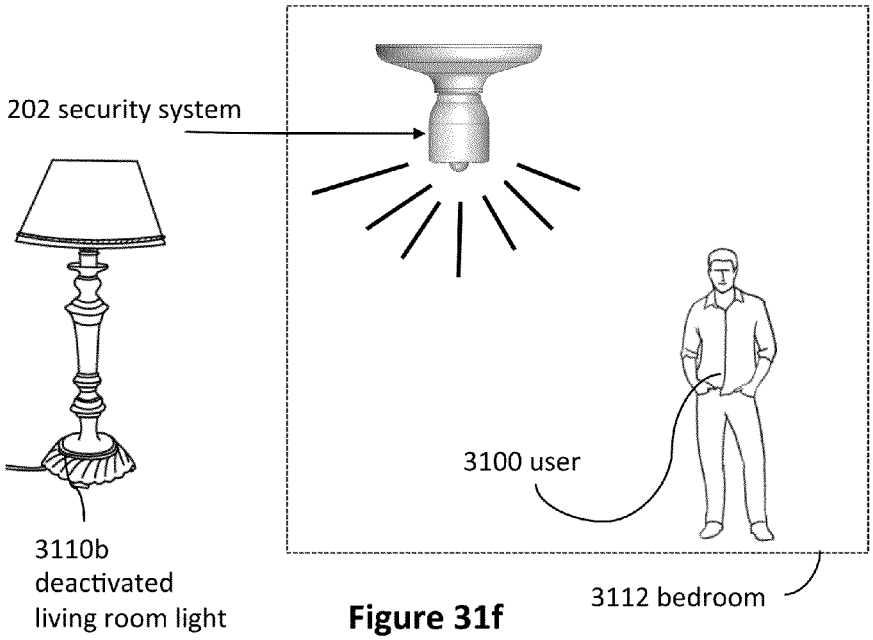


Figure 31f

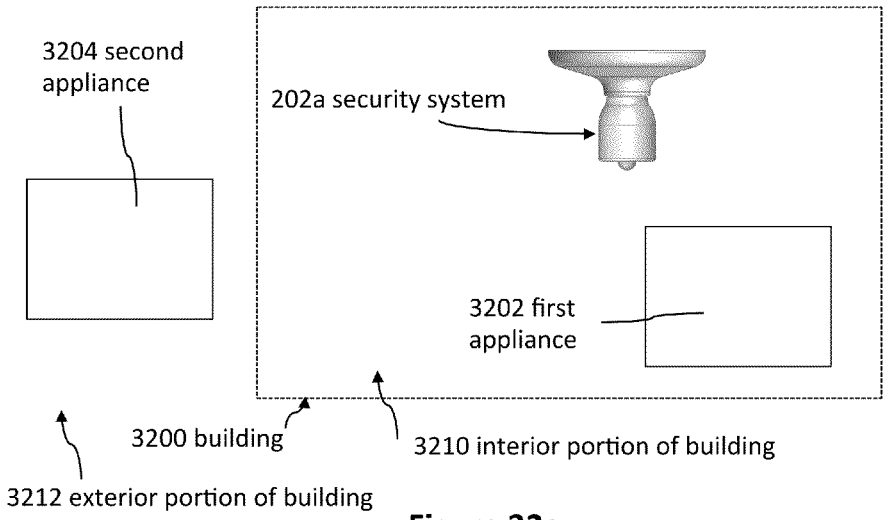


Figure 32a

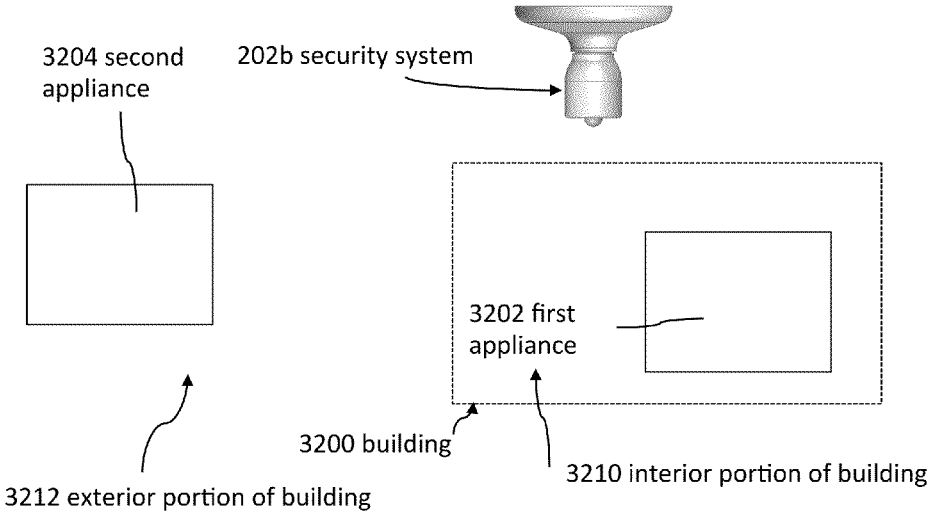


Figure 32b

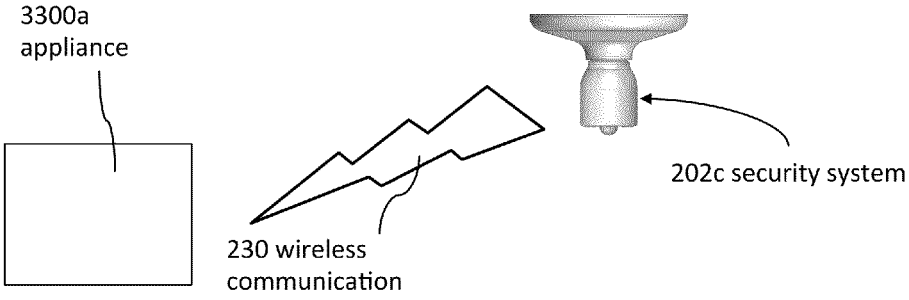


Figure 33a

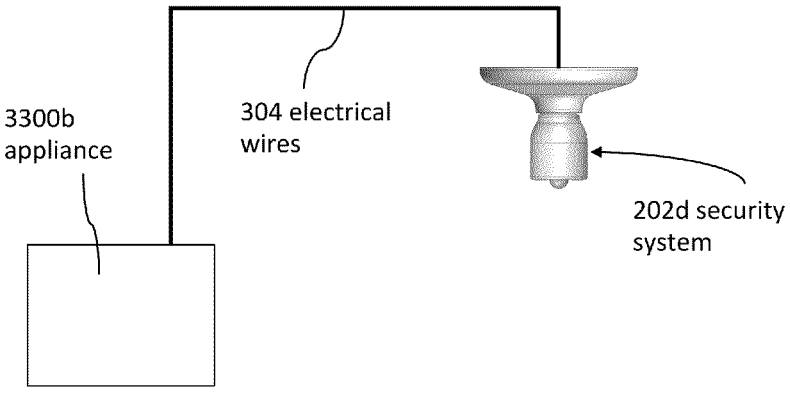


Figure 33b

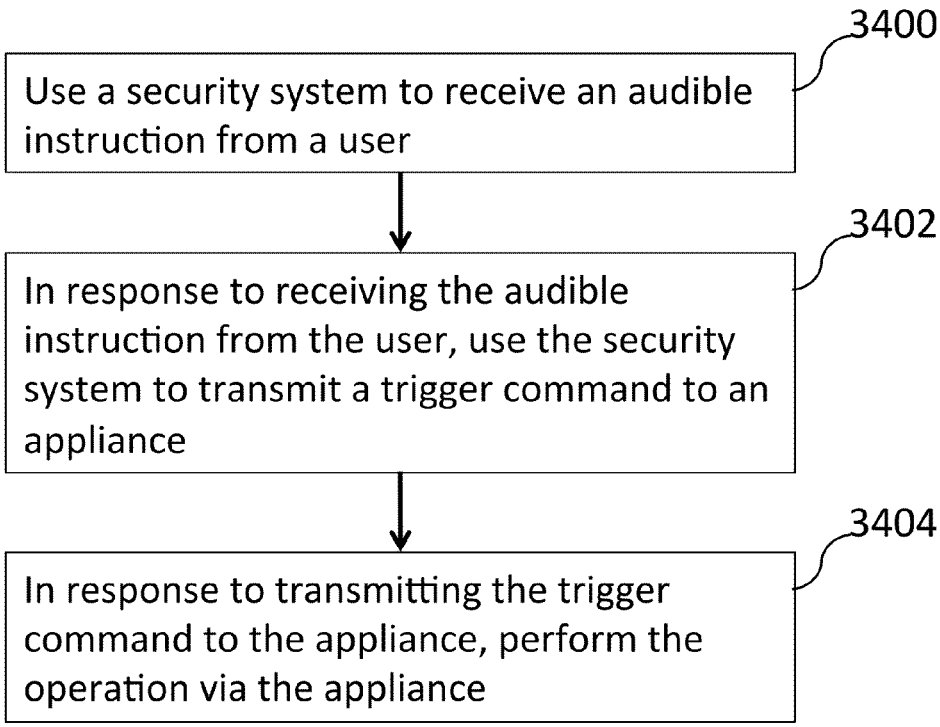
3400
Use a security system to receive an audible instruction from a user
3402
In response to receiving the audible instruction from the user, use the security system to transmit a trigger command to an appliance
3404
In response to transmitting the trigger command to the appliance, perform the operation via the appliance

**Figure 34**

# LIGHT SOCKET CAMERAS

## CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of and is a continuation-in-part of U.S. Nonprovisional patent application Ser. No. 14/469,583; filed Aug. 27, 2014; and entitled SMART LOCK SYSTEMS AND METHODS; the entire contents of which are incorporated herein by reference. U.S. Nonprovisional patent application Ser. No. 14/469,583 claims the benefit of U.S. Provisional Patent Application No. 61/872,439; filed Aug. 30, 2013; and entitled DOORBELL COMMUNICATION SYSTEMS AND METHODS; the entire contents of which are incorporated herein by reference. U.S. Nonprovisional patent application Ser. No. 14/469,583 claims the benefit of and is a continuation-in-part of U.S. Nonprovisional patent application Ser. No. 14/099,888; filed Dec. 6, 2013; and entitled DOORBELL COMMUNICATION SYSTEMS AND METHODS, which issued as U.S. Pat. No. 8,823,795 on Sep. 2, 2014; the entire contents of which are incorporated herein by reference. U.S. Nonprovisional patent application Ser. No. 14/469,583 claims the benefit of and is a continuation-in-part of U.S. Nonprovisional patent application Ser. No. 14/142,839; filed Dec. 28, 2013; and entitled DOORBELL COMMUNICATION SYSTEMS AND METHODS, which issued as U.S. Pat. No. 8,842,180 on Sep. 23, 2014; the entire contents of which are incorporated herein by reference.

This application claims the benefit of and is a continuation-in-part of U.S. Nonprovisional patent application Ser. No. 14/275,811; filed May 12, 2014; and entitled DOORBELL COMMUNICATION SYSTEMS AND METHODS; the entire contents of which are incorporated herein by reference. U.S. Nonprovisional patent application Ser. No. 14/275,811 claims the benefit of and is a continuation-in-part of U.S. Nonprovisional patent application Ser. No. 14/098,772; filed Dec. 6, 2013; and entitled DOORBELL COMMUNICATION SYSTEMS AND METHODS, which issued as U.S. Pat. No. 8,780,201 on Jul. 15, 2014; the entire contents of which are incorporated herein by reference. U.S. Nonprovisional patent application Ser. No. 14/275,811 claims the benefit of U.S. Provisional Patent Application No. 61/859,070; filed Jul. 26, 2013; and entitled DOORBELL COMMUNICATION SYSTEMS AND METHODS; the entire contents of which are incorporated herein by reference.

This application claims the benefit of and is a continuation-in-part of U.S. Nonprovisional patent application Ser. No. 14/463,548; filed Aug. 19, 2014; and entitled DOORBELL COMMUNICATION SYSTEMS AND METHODS; the entire contents of which are incorporated herein by reference.

This application claims the benefit of U.S. Provisional Patent Application No. 62/039,394; filed Aug. 19, 2014; and entitled LIGHT SOCKET CAMERAS; and U.S. Provisional Patent Application No. 62/018,605; filed Jun. 29, 2014; and entitled LIGHT SOCKET CAMERAS; the entire contents of which are incorporated herein by reference.

This application claims the benefit of and is a continuation of U.S. Nonprovisional patent application Ser. No. 14/549,545; filed Nov. 20, 2014; and entitled LIGHT SOCKET CAMERAS; the entire contents of which are incorporated herein by reference. This application and U.S. Nonprovisional patent application Ser. No. 14/549,545 claim the benefit of and are continuation-in-parts of U.S. Nonprovisional patent application Ser. No. 14/534,588; filed Nov. 6, 2014; and entitled LIGHT SOCKET CAMERAS; the entire contents of which are incorporated herein by reference.



## BACKGROUND

1. Technical Field

Various embodiments disclosed herein relate to devices and methods that enable people to observe remote locations. Certain embodiments relate to using a computing device to see video taken by a remotely located camera.

2. Description of Related Art

Video cameras can record images of various events that are viewable by remotely located people. Additionally, video cameras can be supported by objects such as tripods. Furthermore, video cameras often require electrical power. Some video cameras receive electrical power from batteries and/or power outlets.

## SUMMARY

The disclosure describes methods for using a light socket camera to trigger an appliance. The methods can include using a light socket camera to receive an audible instruction from a user, wherein the audible instruction is an instruction to trigger an appliance communicatively coupled to the light socket camera and electrically coupled to a building. The light socket camera can be electrically coupled to the building. The light socket camera can include an outer housing comprising a proximal end, a distal end that is opposite the proximal end, and a sidewall that extends between the proximal end and the distal end, a camera coupled to the outer housing, whereby the camera is configured to record a video, a speaker located within an internal portion of the outer housing, whereby the speaker is configured to transmit an audible message, a microphone located within an internal portion of the outer housing, whereby the microphone is configured to receive an audible instruction, a communication module located within an internal portion of the outer housing, whereby the communication module is configured to connect to a network, and a screw thread contact located adjacent the proximal end of the outer housing, whereby the screw thread contact is rotatably attached to a light socket of the building. In response to receiving the audible instruction from the user, methods can also include using the light socket camera to transmit a trigger command to the appliance, wherein the trigger command triggers the appliance to perform an operation. In response to transmitting the trigger command to the appliance, methods can also include performing the operation via the appliance.

The audible instruction can be a first audible instruction to activate the appliance. As such, the method can further include using the light socket camera to receive a second audible instruction from the user, wherein the second audible instruction comprises an instruction to deactivate the appliance. In response to receiving a second audible instruction from the user, methods can include using the light socket camera to transmit a deactivation command to the appliance. In response to transmitting the deactivation command to the appliance, methods can also include deactivating the appliance.

The building can include an enclosed interior portion and an exterior portion opposite the interior portion. In some methods, at least a portion of the appliance is located along the exterior portion of the building, and at least a portion of the light socket camera is located along the exterior portion of the building. In some methods the appliance is located entirely within the interior portion of the building, and the light socket camera is located entirely within the interior

portion of the building. Furthermore, in some methods at least a portion of the appliance is located along the exterior portion of the building, and wherein the light socket camera is located entirely within the interior portion of the building.

The building can comprise a first room and a second room. The light socket camera can be located in the first room and the appliance can be located in the second room. The appliance can be selected from the group consisting of a light, television, garage door opener, and door lock.

As well, the appliance can be a light, and the audible instruction can be a first audible instruction comprising an instruction to illuminate the light. The method can further include using the light socket camera to receive a second audible instruction from the user, wherein the second audible instruction comprises an instruction to deactivate the light. In response to receiving a second audible instruction from the user, methods can include using the light socket camera to transmit a deactivation command to the light. In response to transmitting the deactivation command to the appliance, methods can include deactivating the light.

The appliance can be a television, and the audible instruction can be a first audible instruction comprising an instruction to activate the television. Methods can include using the light socket camera to receive a second audible instruction from the user, wherein the second audible instruction comprises an instruction to deactivate the television. In response to receiving the second audible instruction from the user, methods can include using the light socket camera to transmit a deactivation command to the television. As well, in response to transmitting the deactivation command to the television, methods can include deactivating the television. Methods can also include using the light socket camera to receive a third audible instruction from the user, wherein the third audible instruction comprises an instruction to change an input channel of the television. In response to receiving the third audible instruction from the user, methods can include using the light socket camera to transmit a change command to the television. In response to transmitting the change command to the television, methods can include changing the input channel of the television.

The appliance can be a garage door opener, and the audible instruction can be a first audible instruction comprising an instruction to open a garage door mechanically coupled to the garage door opener. Methods can further include using the light socket camera to receive a second audible instruction from the user, wherein the second audible instruction comprises an instruction to close the garage door. In response to receiving the second audible instruction from the user, methods can include using the light socket camera to transmit a close command to the garage door opener. In response to transmitting the close command to the garage door opener, methods can include closing the garage door.

Methods can also include using the light socket camera to receive a second audible instruction from the user, wherein the second audible instruction comprises an instruction to lock the door lock. In response to receiving the second audible instruction from the user, methods can include using the light socket camera to transmit a lock command to the door lock. In response to transmitting the lock command to the door lock, methods can include moving a lock of the door lock to a locked position.

The light socket camera can be a first light socket camera, and the appliance can include a second light socket camera having a camera, a speaker, and a microphone, wherein the second light socket camera is communicatively coupled to the first light socket camera. The second light socket camera can be electrically coupled to the building and mechanically coupled to an electrical outlet of the building.

Methods can include using the light socket camera to receive a second audible instruction to determine whether a visitor is located within a line of sight of the second light socket camera. In response to receiving the second audible instruction, methods can include using the light socket camera to transmit a line of sight command to the second light socket camera. In response to transmitting the line of sight command to the second light socket camera, methods can also include determining whether the visitor is located within the line of sight of the second light socket camera.

The audible instruction can further include an instruction to determine an identity of the visitor. In response to determining that the visitor is located within the line of sight of the second light socket camera, methods can include using the light socket camera to transmit an identity command to the second light socket camera. In response to transmitting the identity command to the second light socket camera, methods can include determining the identity of the visitor.

Using the light socket camera to determine the identity of the visitor can comprise using the light socket to determine the identity of the visitor via one of facial recognition, iris recognition, and retina scanning.

The appliance can be a first appliance, and the audible instruction can be a first audible instruction comprising an instruction to activate the first appliance. Methods can further include using the light socket camera to receive a second audible instruction from the user. The second audible instruction can include an instruction to activate a second appliance. In response to receiving the second audible instruction, methods can include using the light socket camera to transmit an activation command to the second appliance. In response to transmitting the activation command to the second appliance, methods can include activating the second appliance.

The first appliance can be a light, and the second appliance can be a television. Methods can further include using the light socket camera to receive a third audible instruction from the user, wherein the third audible instruction comprises an instruction to unlock a door lock. In response to receiving the third audible instruction, methods can include using the light socket camera to transmit an unlock command to the door lock. In response to transmitting the unlock command to the door lock, methods can include moving a lock of the door lock to the unlocked position.

Methods can include using the communication module to wirelessly transmit the command to the appliance via one of Wi-Fi, Bluetooth, radio frequency, Near Field Communication, and infrared.

As well, methods can include using the communication module to transmit the command to the appliance via a wire, wherein the wire is electrically and communicatively coupled to the light socket camera. The wire can comprise a copper wire located within the building, wherein the copper wire is electrically coupled to a transformer such that the copper wire transmits electricity from the transformer to the light socket camera, and the copper wire transmits electricity from the transformer to the appliance, and wherein the copper wire communicatively transmits the command from the light socket camera to the appliance.

Furthermore, in response to receiving the audible instruction from the user, the method can further include using the light socket camera to determine the identity of the user. In response to determining the identity of the user, methods can include using the light socket camera to determine whether the user is an authorized user or an unauthorized user of the appliance. In response to determining the user is an autho-

rized user of the appliance, methods can include using the light socket camera to transmit the trigger command to the appliance, wherein the trigger command triggers the appliance to perform an operation. In response to transmitting the trigger command to the appliance, methods can include performing the operation via the appliance.

Methods can also include using the light socket camera to determine whether an Internet connection exists between the light socket camera and a remote server. In response to determining that the Internet connection does not exist between the light socket camera and the remote server, methods can include using the light socket camera to transmit the trigger command to the appliance via a WiFi router. In response to determining that the Internet connection does exist between the light socket camera and the remote server, methods can include using the light socket camera to transmit the trigger command to the appliance via the remote server.

Furthermore, methods can include using the light socket camera to determine whether the light socket camera is electrically coupled to the building. In response to determining the light socket camera is not electrically coupled to the building and in response to receiving the audible instruction from the user, methods can include using the light socket camera to activate a light on the light socket camera to thereby illuminate an area adjacent the light socket camera.

## BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects, and advantages are described below with reference to the drawings, which are intended to illustrate, but not to limit, the invention. In the drawings, like reference characters denote corresponding features consistently throughout similar embodiments.

FIG. **1***a* illustrates a front view of a communication system, according to some embodiments.

FIG. **1***b* illustrates a front view of a security system, according to some embodiments.

FIG. **2** illustrates a computing device running software, according to some embodiments.

FIG. **3** illustrates an embodiment in which a security system is connected to a building, according to some embodiments.

FIG. **4** illustrates a perspective view of a light socket, according to some embodiments.

FIG. **5** illustrates a perspective view of a light bulb mechanically and electrically coupled to a light socket, according to some embodiments.

FIG. **6** illustrates a perspective view of a security system prior to the security system being mechanically and electrically coupled to the light socket, according to some embodiments.

FIG. **7** illustrates the security system mechanically and electrically coupled to the light socket, according to some embodiments.

FIGS. **8** and **9** illustrate perspective views of security systems, according to some embodiments.

FIG. **10** illustrates a perspective view of electrical contacts, according to some embodiments.

FIG. **11** illustrates a side view of a security system with a cone-shaped mirror, according to some embodiments.

FIG. **12** illustrates a perspective view of the security system with a cone-shaped mirror, according to some embodiments.

FIGS. **13***a*, **13***b*, **13***c*, and **13***d* illustrate side views of security systems with respective dome camera assembly, according to various embodiments.

FIG. **13***e* illustrates a top-down view of a security system with a horizontal field of vision, according to some embodiments.

FIG. **14** illustrates a perspective view of a security system, according to some embodiments.

FIGS. **15** and **16** illustrate a user interface with an adjustable viewing orientation, according to some embodiments.

FIG. **17** illustrates a security system detecting a visitor, according to some embodiments.

FIGS. **18-27** illustrate flow-charts of various methods of using a security system, according to various embodiments.

FIG. **28***a* illustrates a security system detecting a sound, according to an embodiment.

FIGS. **28***b*-**28***f* illustrate various responses to detecting the sound from FIG. **28***a*, according to various embodiments.

FIGS. **29** and **30** illustrate flow-charts of various methods of using a security system, according to various embodiments.

FIG. **31***a* illustrates a security system detecting an audible instruction, according to an embodiment.

FIGS. **31***b*-**31***f* illustrate various responses to detecting the audible instruction from FIG. **31***a*, according to various embodiments.

FIGS. **32***a* and **32***b* illustrate various embodiments of a security system, first appliance and second appliance being located inside or outside a building, according to various embodiments.

FIGS. **33***a* and **33***b* illustrate various embodiments of a security system being connected to an appliance via a wireless connection and a wired connection, according to various embodiments.

FIG. **34** illustrates a flow-chart of a method of using a security system, according to an embodiment.

## DETAILED DESCRIPTION

Although certain embodiments and examples are disclosed below, inventive subject matter extends beyond the specifically disclosed embodiments to other alternative embodiments and/or uses, and to modifications and equivalents thereof. Thus, the scope of the claims appended hereto is not limited by any of the particular embodiments described below. For example, in any method or process disclosed herein, the acts or operations of the method or process may be performed in any suitable sequence and are not necessarily limited to any particular disclosed sequence. Various operations may be described as multiple discrete operations in turn, in a manner that may be helpful in understanding certain embodiments; however, the order of description should not be construed to imply that these operations are order dependent. Additionally, the structures, systems, and/or devices described herein may be embodied as integrated components or as separate components.

For purposes of comparing various embodiments, certain aspects and advantages of these embodiments are described. Not necessarily all such aspects or advantages are achieved by any particular embodiment. Thus, for example, various embodiments may be carried out in a manner that achieves or optimizes one advantage or group of advantages as taught herein without necessarily achieving other aspects or advantages as may also be taught or suggested herein.

System Embodiments

Communication systems can provide a secure and convenient way for a remotely located individual to see and/or communicate with a person who is within the field of vision of a camera and/or within the range of a microphone. Commu-

nication systems can include a camera that is attached to a light socket to couple the camera to a wall and to provide electricity to the camera.

Some communication systems can allow an individual to hear, see, and talk with visitors. For example, communication systems can use a computing device to enable a remotely located person to see, hear, and/or talk with visitors. Computing devices can include computers, laptops, tablets, mobile devices, smartphones, cellular phones, and wireless devices (e.g., cars with wireless communication). Specifically, example computing devices include the iPhone, iPad, iMac, MacBook Air, and MacBook Pro made by Apple Inc. Communication between a remotely located person and a visitor can occur via the Internet, cellular networks, telecommunication networks, and wireless networks.

Referring now to FIG. **1***a*, communication systems **200** can be a portion of a smart home hub. Communication systems **200** can facilitate home automation. In some cases, cameras **208** are electrically coupled to a light socket of a building **300** and are integrated into a holistic home automation system and/or home security system. Various systems described herein enable home surveillance and/or complete home automation. Cameras **208** threadably screwed into an interior light socket can enable a remote user to see events inside of a building **300** (shown in FIG. **3**). As well, cameras **208** threadably screwed into exterior light sockets can enable a remote user to see events outside of a building **300**.

In some embodiments, the security system **202***c* controls various electrical items in a home (e.g., lights, air conditioners, heaters, motion sensors, garage door openers, locks, televisions, computers, entertainment systems, appliances, pool monitors, elderly monitors, and the like). In some embodiments, the computing device **204** controls the security system **202***c* and other electrical items in a home (e.g., lights, air conditioners, heaters, motion sensors, garage door openers, locks, televisions, computers, entertainment systems, appliance, pool monitors, elderly monitors, and the like).

FIG. **1** illustrates a front view of a communication system embodiment. The communication system **200** can include a security system **202***c* (e.g., a camera assembly) and a computing device **204**. Although the illustrated security system **202***c* includes many components in one housing, several security system embodiments include components in separate housings. The security system **202***c* can include a camera assembly **208**. The camera assembly **208** can include a video camera, which in some embodiments is a webcam. The camera assembly **208** can be configured to take videos of a surrounding area for viewing via the Internet. However, it should be appreciated that the camera assembly **208** can be a still camera, any type of digital camera, virtual camera, and the like. Generally, it should be appreciated that the camera assembly **208** can be any type of camera or optical instrument that records images that can be stored directly, transmitted to another location, or both.

Now with added reference to FIG. **1***b*, the security system **202***c* can include a proximal end **280** and a distal end **282** that is opposite the proximal end **280**. The camera assembly **208** can be located at the distal end **282** of the security system **202***c*. However, it should be appreciated that the camera assembly **208** can be positioned at any location on the security system **202***c*, such as the sidewall **680**. The security system **202***c* can also include a foot contact **618** located at the proximal end **280** of the security system **202***c*.

It should be appreciated that the security system **202***c* can include more than one camera assembly **208**. For example, the security system **202***c* may include two cameras. In some embodiments, the security system **202***c* includes a first camera disposed at the distal end **282** of the security system **202***c*, and a second camera disposed along the sidewall **680** of the security system **202***c*. In this manner the second camera may face perpendicular to the direction the first camera is facing. This may allow the security system **202***c* to have a larger field of vision of the area to which the security system **202***c* is monitoring.

Moreover, the security system **202***c* can also include a third camera, a fourth camera, and a fifth camera. The cameras can be mounted at any location along the security system **202***c* to thereby expand the field of vision of the security system **202***c*. As well, the camera(s) **208** may be configured to move away from the security system **202***c* and pivot along at least two axes. The movement of the camera(s) **208** may be controlled via manual manipulation by a person, a command from a remote computing device **204**, automatically in response to the occurrence of an event, or the like.

As shown in FIG. **1***a*, the security system **202***c* can include a diagnostic light **216** and a power indicator light **220**. In some embodiments, the diagnostic light **216** is a first color (e.g., blue) if the security system **202***c* and/or the communication system **200** is connected to a wireless Internet network and is a second color (e.g., red) if the security system **202***c* and/or the communication system **200** is not connected to a wireless Internet network. In some embodiments, the power indicator **220** is a first color if the security system **202***c* is connected to a power source. The power source can be power supplied by the building **300** to which the security system **202***c* is attached. The security system **202***c* can receive electricity via the light socket to which the security system **202***c* is attached. In some embodiments, the power indicator **220** is a second color or does not emit light if the security system **202***c* is not connected to the power source.

The security system **202***c* (e.g., a camera assembly) can include an outer housing **634**, which can be water resistant and/or waterproof. The outer housing **634** can be made from metal or plastic, such as molded plastic with a hardness of 60 Shore D. In some embodiments, the outer housing **634** is made from brushed nickel or aluminum. The outer housing **634** can be rigid.

Rubber seals can be used to make the outer housing **634** water resistant or waterproof. The security system **202***c* can be electrically coupled to a power source, such as wires electrically connected to a building's electrical power system. In some embodiments, the security system **202***c* includes a battery for backup and/or primary power.

As shown in FIG. **1**, the security system **202***c* can include a screw thread contact **614** having a proximal end adjacent the foot contact **618** and a distal end that is opposite the proximal end. The distal end of the screw thread contact **614** can be located adjacent the proximal end of the outer housing **634**. The screw thread contact **614** can also include a threaded sidewall that extends between the proximal end and the distal end of the screw thread contact **614**. In this manner, the threaded sidewall of the screw thread contact **614** can be configured to rotatably attach to the light socket **650**.

The security system can include lights **626**, which can be LED lights configured to illuminate a room and/or an outdoor area. In some embodiments, the lights **626** can provide at least 10 lumens, at least 1,000 lumens, at least 4,000 lumens, and/or less than 40,000 lumens. The lights **626** can be aligned such that the lights **626** are parallel to a central axis **266** of a screw thread contact **614**. The lights **626** can be oriented such that they face away from the foot contact **618**.

As well, the security system **202***c* can include lights **630**, which can be infrared lights. The lights **630** can illuminate an area in front of the camera assembly's **208** field of vision to

enable the camera assembly **208** to capture easily viewable and high-quality video. In this regard, the lights **630** can be located at the distal end **282** of the security system **202***c*, adjacent to the camera assembly **208**. Infrared light can be suitable for nighttime video recording. In some embodiments the security system **202***c* includes a photosensor and/or a photodetector to determine whether the field of vision of the camera assembly **208** is illuminated. In response to determining that the field of vision is not illuminated, the security system **202***c* can illuminate the light and use the camera assembly **208** to record a video of the visitor. It should be appreciated that the security system **202***c* can include any type of sensor configured to determine an amount of light, such as a reverse-biased light emitting diode (LED), photovoltaic cell, photodiode, ultraviolet light sensor, and the like.

The lights **626** and **630** can be controlled by any number of means. For example, the security system **202***c* can be configured to receive a first instruction from the remote computing device **204**. The first instruction can include a command to illuminate either or both of the lights **626** and/or **630**. In response to receiving the first instruction from the remote computing device **204**, the security system **202***c* can illuminate the lights **626** and/or **630**. As well, the security system **202***c* can receive a second instruction from the remote computing device **204**. The second instruction can include a command to de-activate the lights **626** and/or **630**. Accordingly, in response to receiving the second instruction from the remote computing device **204**, the security system **202***c* can de-activate the lights **626** and/or **630**.

The security system **202***c* can also be configured to illuminate and de-activate the lights **626** and/or **630** in a number of different manners. For example, the security system **202***c* can be configured to receive an audible instruction via the microphone **234** of the security system **202***c*. The audible instruction can be a spoken command by the visitor to thereby illuminate and/or de-activate the lights **626** and/or **630**. For example, the audible instruction can be the visitor saying, "Turn lights on," "Illuminate lights," "Lights off," "Dim lights," and the like. Generally, the audible instruction can be any spoken command or noise from the visitor, which is thereby received by the security system **202***c* to illuminate the lights. Accordingly, in response to receiving the audible instruction from the visitor, the security system **202***c* can illuminate or de-activate the lights **626** and/or **630**.

As well, the security system **202***c* can include a communication module **262** configured to enable wireless communication with the computing device **204**. The communication module **262** can include a WiFi antenna and can be configured to enable the security system **202***c* to connect to a wireless network **308** of a building **300** (shown in FIG. **3**).

Wireless communication **230** can enable the security system **202***c* (e.g., a camera assembly) to communicate with the computing device **204**. Accordingly, the security system **202***c* may include a communication module **262** located within an internal portion of the outer housing **634**. The communication module **262** may be configured to connect to a wireless communication network. Some embodiments enable communication via cellular and/or WiFi networks. Some embodiments enable communication via the Internet. Several embodiments enable wired communication between the security system **202***c* and the computing device **204**. The wireless communication **230** can include the following communication means: radio, WiFi (e.g., wireless local area network), cellular, Internet, Bluetooth, telecommunication, electromagnetic, infrared, light, sonic, and microwave. Other communication means are used by some embodiments. In some embodiments, such as embodiments that include telecommunication or cellular communication means, the security system **202***c* can initiate voice calls or transmit text messages to a computing device **204** (e.g., a smartphone, a desktop computer, a tablet computer, a laptop computer).

Several embodiments use near field communication (NFC) to communicate between the computing device **204** and the security system **202***c*. The security system **202***c* and/or the computing device **204** can include a NFC tag. Some NFC technologies include Bluetooth, radio-frequency identification, and QR codes.

Several embodiments include wireless charging (e.g., near field charging, inductive charging) to supply power to and/or from the security system **202***c* and the computing device **204**. Some embodiments use inductive charging (e.g., using an electromagnetic field to transfer energy between two objects).

Some embodiments include computer software (e.g., application software), which can be a mobile application designed to run on smartphones, tablet computers, and other mobile devices. Software of this nature is sometimes referred to as "app" software. In some embodiments the computer software includes software designed to run on desktop computers and laptop computers.

The computing device **204** can run software with a graphical user interface. The user interface can include icons or buttons. In some embodiments, the software is configured for use with a touch-screen computing device such as a smartphone or tablet.

The security system **202***c* can include a motion detector **218** configured to detect the presence of people (e.g., in the outdoor area or room in which the security system **202***c* is located) or objects. The security system **202***c* can also be placed outdoors to detect people or objects outside. The motion detector **218** can be an infrared motion detector.

As illustrated in FIGS. **6-10**, the security system **202***c* can be attached to a light socket **650** to couple the security system **202***c* to an electrical power source (e.g., of a building **300** shown in FIG. **3**). The security system **202***c* can include a screw thread electrical contact **614**, which can comprise a conductive metal. The security system **202***c* can also include a foot electrical contact **618**, which can comprise a conductive metal. The screw thread contact **614** can be electrically insulated from the foot electrical contact **618** by insulation **638**.

The security system **202***c* can be coupled to the light socket **650** via any number of connection methods. For example, the screw thread contact **614** of the security system **202***c* can be rotatably attached to the light socket **650** to thereby couple the security system **202***c* to the light socket **650**. When the security system **202***c* is coupled to the light socket **650**, the foot contact **618** of the security system **202***c* can be electrically coupled to the foot contact **654** of the light socket **650**, to thereby couple the security system **202***c* to the electrical power source (i.e. to energize the security system **202***c*).

A power converter **610** can be electrically coupled to the screw thread contact **614** and the foot contact **618**. The power converter **610** can be configured to convert electricity from the building **300** (shown in FIG. **3**) to a type of power that is more suitable for the security system **202***c*. In some embodiments, the power converter **610** converts an input voltage to a lower voltage and/or converts AC to DC power. Furthermore, it should be appreciated that the power converter **610** can be configured to adapt to the input voltages of any country, and thereby convert the input voltage to a voltage suited for the security system **202***c*.

FIG. **2** illustrates a computing device **204** running software. The software includes a user interface **240** displayed on a display screen **242**. The user interface **240** can include a security system indicator **244**, which can indicate the location

of the security system that the user interface is displaying. For example, a person can use one computing device **204** to control and/or interact with multiple security systems, such as one security system located at a front door and another security system located at a back door. Selecting the security system indicator **244** can allow the user to choose another security system (e.g., the back door security system rather than the front door security system).

The user interface **240** can include a connectivity indicator **248**. In some embodiments, the connectivity indicator can indicate whether the computing device is in communication with a security system, the Internet, and/or a cellular network. The connectivity indicator **248** can alert the user if the computing device **204** has lost its connection with the security system **202***c*; the security system **202***c* has been damaged; the security system **202***c* has been stolen; the security system **202***c* has been removed from its mounting location; the security system **202***c* has lost electrical power; and/or if the computing device **204** cannot communicate with the security system **202***c*. In some embodiments, the connectivity indicator **248** alerts the user of the computing device **204** by flashing, emitting a sound, displaying a message, and/or displaying a symbol.

Referring now to FIG. **1***a*, in some embodiments, if the security system **202***c* loses power, loses connectivity to the computing device **204**, loses connectivity to the Internet, and/or loses connectivity to a remote server, a remote server **206** transmits an alert (e.g., phone call, text message, image on the user interface **240**) regarding the power and/or connectivity issue. In several embodiments, the remote server **206** can manage communication between the security system **202***c* and the computing device **204**. In some embodiments, information from the security system **202***c* is stored by the remote server **206**. In several embodiments, information from the security system **202***c* is stored by the remote server **206** until the information can be sent to the computing device **204**, uploaded to the computing device **204**, and/or displayed to the remotely located person via the computing device **204**. The remote server **206** can be a computing device that stores information from the security system **202***c* and/or from the computing device **204**. In some embodiments, the remote server **206** is located in a data center.

In some embodiments, the computing device **204** and/or the remote server **206** attempts to communicate with the security system **202***c*. If the computing device **204** and/or the remote server **206** is unable to communicate with the security system **202***c*, the computing device **204** and/or the remote server **206** alerts the remotely located person via the software, phone, text, a displayed message, and/or a website.

In some embodiments, the computing device **204** and/or the remote server **206** attempts to communicate with the security system **202***c* periodically; at least every five hours and/or less frequently than every 10 minutes; at least every 24 hours and/or less frequently than every 60 minutes; or at least every hour and/or less frequently than every second.

In some embodiments, the server **206** can initiate communication to the computer device **204** and/or to the security system **202***c*. In several embodiments, the server **206** can initiate, control, and/or block communication between the computing device **204** and the security system **202***c*.

In several embodiments, a user can log in to an "app," website, and/or software on a computing device (e.g., mobile computing device, smartphone, tablet, desktop computer) to adjust the security system settings discussed herein.

In some embodiments, a computing device can enable a user to watch live video and/or hear live audio from a security system due to the user's request rather than due to actions of a visitor. Some embodiments include a computing device initiating a live video feed (or a video feed that is less than five minutes old).

Referring now to FIG. **2**, in some embodiments, the user interface **240** displays an image **252** such as a still image or a video of an area near and/or in front of the security system **202***c*. The image **252** can be taken by the camera assembly **208** and stored by the security system **202***c*, server **206**, and/or computing device **204**. The user interface **240** can include a recording button **256** to enable a user to record images, videos, and/or sound from the camera assembly **208**, microphone of the security system **202***c*, and/or microphone of the computing device **204**.

In several embodiments, the user interface **240** includes a picture button **260** to allow the user to take still pictures and/or videos of the area near and/or in front of the security system **202***c*. The user interface **240** can also include a sound adjustment button **264** and a mute button **268**. The user interface **240** can include camera manipulation buttons such as zoom, pan, and light adjustment buttons. In some embodiments, the camera assembly **208** automatically adjusts between Day Mode and Night Mode. Some embodiments include an infrared camera and/or infrared lights to illuminate an area near the security system **202***c* to enable the camera assembly **208** to provide sufficient visibility (even at night).

In some embodiments, buttons include diverse means of selecting various options, features, and functions. Buttons can be selected by mouse clicks, keyboard commands, or touching a touch screen. Many embodiments include buttons that can be selected without touch screens.

In some embodiments, the user interface **240** includes a quality selection button, which can allow a user to select the quality and/or amount of data transmitted from the security system **202***c* to the computing device **204** and/or from the computing device **204** to the security system **202***c*.

In some embodiments, video can be sent to and/or received from the computing device **204** using video chat protocols such as FaceTime (by Apple Inc.) or Skype (by Microsoft Corporation). In some embodiments, these videos are played by videoconferencing apps on the computing device **204** instead of being played by the user interface **240**.

As shown in FIG. **2**, the user interface **240** can include a termination button **276** to end communication between the security system **202***c* and the computing device **204**. In some embodiments, the termination button **276** ends the ability of the person located near the security system **202***c* (i.e., the visitor) to hear and/or see the user of the computing device **204**, but does not end the ability of the user of the computing device **204** to hear and/or see the person located near the security system **202***c*.

In some embodiments, a button **276** is both an answer button (to accept a communication request from a visitor) and a termination button (to end communication between the security system **202***c* and the computing device **204**). The button **276** can include the word "Answer" when the system is attempting to establish two-way communication between the visitor and the user. Selecting the button **276** when the system is attempting to establish two-way communication between the visitor and the user can start two-way communication. The button **276** can include the words "End Call" during two-way communication between the visitor and the user. Selecting the button **276** during two-way communication between the visitor and the user can terminate two-way communication. In some embodiments, terminating two-way communication still enables the user to see and hear the visitor. In some embodiments, terminating two-way communication causes the computing device **204** to stop showing

video from the security system and to stop emitting sounds recorded by the security system.

In some embodiments, the user interface **240** opens as soon as the security system **202***c* detects a visitor (e.g., senses indications of a visitor). Once the user interface **240** opens, the user can see and/or hear the visitor. The security system **202***c* can include a microphone **234** and a speaker **236** to enable the user to hear the visitor and to enable the visitor to hear the user. In this regard, the speaker **236** may be configured to transmit an audible message to the visitor and the microphone **234** may be configured to receive an audible message from the visitor. In some embodiments the speaker **236** and microphone **234** are located within an internal portion of the outer housing **634**. However, in other embodiments, the speaker **236** and microphone **234** are located along an external surface of the outer housing **634**. Thus, the security system **202***c* can enable the user to communicate with the visitor.

Some method embodiments include detecting a visitor with a security system. The methods can include causing the user interface **240** (shown in FIG. **2**) to display on a remote computing device **204** due to the detection of the visitor (e.g., with or without user interaction). The methods can include displaying video from the security system and/or audio from the security system.

In some embodiments, the software includes means to start the video feed on demand. For example, a user of the computing device might wonder what is happening near the security system **202***c*. The user can open the software application on the computing device **204** and instruct the application to show live video and/or audio from the security device **202***c* even if no event near the security system **202***c* has triggered the communication.

In several embodiments, the security device **202***c* can be configured to record video, images, and/or audio when the security device **202***c* detects movement and/or the presence of a person. The user of the computing device **204** can later review all video, image, and/or audio records when the security device **202***c* detected movement and/or the presence of a person.

Referring now to FIG. **1***a*, in some embodiments, the server **206** controls communication between the computing device **204** and the security system **202***c*, which can include a camera, a microphone, and a speaker. In several embodiments, the server **206** does not control communication between the computing device **204** and the security system **202***c*.

In some embodiments, data captured by the security system and/or the computing device **204** (such as videos, pictures, and audio) is stored by another remote device such as the server **206**. Cloud storage, enterprise storage, and/or networked enterprise storage can be used to store video, pictures, and/or audio from the communication system **200** or from any part of the communication system **200**. The user can download and/or stream stored data and/or storage video, pictures, and/or audio. For example, a user can record visitors for a year and then later can review the visits from the last year. In some embodiments, remote storage, the server **206**, the computing device **204**, and/or the security system **202***c* can store information and statistics regarding visitors and usage.

The communication system **200** can include the security system **202***c*, the computing device **204**, and/or the server **206**. Some communication systems use many systems to enable communication between the security system **202***c* and the computing device **204**.

FIG. **3** illustrates an embodiment in which a security system **202***c* is connected to a building **300**, which can include an entryway **310** that has a door **254**. Electrical wires **304** can electrically couple the security system **202***c* to the electrical system of the building **300** such that the security system **202***c* can receive electrical power from the building **300** (e.g., via a light socket that is attached to the building **300**).

A wireless network **308** can allow devices to wirelessly access the Internet. The security system **202***c* can access the Internet via the wireless network **308**. The wireless network **308** can transmit data from the security system **202***c* to the Internet, which can transmit the data to remotely located computing devices **204**. The Internet and wireless networks can transmit data from remotely located computing devices **204** to the security system **202***c*. In some embodiments, a security system **202***c* connects to a home's WiFi.

As illustrated in FIG. **3**, one computing device **204** (e.g., a laptop, a smartphone, a mobile computing device, a television) can communicate with multiple security systems **202***c*. In some embodiments, multiple computing devices **204** can communicate with one security system **202***c*.

In some embodiments, the security system **202***c* can communicate (e.g., wirelessly **230**) with a television **306**, which can be a smart television. Users can view the television **306** to see a visitor and/or talk with the visitor.

As well, in some embodiments, the visitor and user of the remote computing device **204** are able to talk with each other, via the security system **202***c* and the remote computing device **204**. For example, the security system **202***c* may be configured to transmit a first audible message to the visitor. The first audible message may be received by a microphone in the remote computing device **204** and transmitted to the security system **202***c*. In this regard, the first audible message may be audibly transmitted to the visitor via the speaker **236** in the security system **202***c*. As well, the security system may be configured to transmit a second audible message to a user of the remote computing device **202***c*. The second audible message may be received by the microphone **234** in the security system **202***c* and transmitted to the remote computing device. In this regard, the second audible message may audibly transmitted to the user via a speaker in the remote computing device **204**.

FIG. **4** illustrates a perspective view of a light socket **650**. The light socket **650** can include a screw thread contact **652** configured to mechanically and electrically couple with the screw thread contact **614** of the security system **202***c* (shown in FIG. **1***a*). The light socket **650** can also include a foot contact **654** configured to electrically couple with the foot contact **618** of the security system **202***c* (shown in FIG. **1***a*). The foot contact **654** of the light socket **650** can be located at the distal end of the light socket **650**.

In some embodiments, the security system **202***c* can be described as having a proximal end and a distal end that is opposite the proximal end. The camera assembly **208** can be located at the distal end of the security system **202***c*. The security system **202***c* can include the foot electrical contact **618** located at the proximal end of the security system **202***c*. In order to energize the security system **202***c*, the security system **202***c* can be oriented such that the foot electrical contact **618** faces the foot contact **654** of the light socket **650**. In this manner the distal end of the security system **202***c* faces away from the foot contact **654** of the light socket **650**. As well, the camera assembly **608** can face away from the foot contact **654** of the light socket **650**. Once the security system **202***c* is oriented in this manner, the security system **202***c* can be attached to the light socket **650**.

In some embodiments, the security system **202***c* is rotated as it is attached to the light socket **650**. As shown in FIG. **6**, the security system **202***c* can be rotated in a direction of rotation **690** about a first axis **266** to thereby attach the security system

202*c* to the light socket **650**. As such, the foot contact **654** of the light socket **650** can be electrically coupled to the security system **202***c*. Furthermore, in many embodiments the foot contact **654** of the light socket **650** is electrically coupled to a light switch (not shown). In this manner, the foot contact **654** of the light socket **650**, and the foot contact **618** of the security system **202***c* can be energized, when the light switch is activated (i.e. turned on).

FIG. **5** illustrates a perspective view of a light bulb **656** mechanically and electrically coupled to the light socket **650**. The light bulb **656** can be removed and replaced by a security system that comprises lights and a camera.

FIG. **6** illustrates a perspective view of the security system **202***c* just before the security system **202***c* is screwed into the light socket **650** to mechanically couple the security system **202***c* to a wall and/or to a building **300**. Screwing the security system **202***c* into the light socket **650** also enables the security system **202***c* to receive electricity from the building **300** (shown in FIG. **3**).

FIG. **7***a* illustrates the security system **202***c* screwed into the light socket **650**. In this configuration, the security system **202***c* is electrically coupled to a power supply of the building **300**. The light socket **650** can be located indoors or outdoors.

FIG. **8** illustrates a perspective view of the security system **202***c*. Not all of the lights **626**, **630** are labeled to clarify other features. The camera assembly **208** can be aligned with a central axis **266** of the screw thread contact **614**. The camera assembly **208** can include a fisheye lens. The camera assembly **208** can also include a cone-shaped mirror to enable viewing 360 degrees around the camera and/or around the outer housing **634**. Software can be used to convert videos and/or pictures taken using the cone-shaped mirror into different formats (e.g., that are easier for users to interpret and/or include less distortion).

FIGS. **9** and **10** illustrate a security system **202***d* that can include any of the features described in the context of the security system **202***c* shown in FIGS. **1***a*, **1***b* and **3**-**8**. The security system **202***d*, as shown in FIG. **9**, can also be configured to screw into the light socket **650**. In this manner, the security system **202***d* can be rotated in a direction of rotation **690** about a first axis **266** to thereby attach the security system **202***d* to the light socket **650**. The security system **202***d* can include a camera assembly **208***d* that faces a radial direction that is perpendicular to the first axis **266**.

As shown in FIG. **9**, the security system **202***d* can include a motion detector **218***d* configured to detect visitors (e.g., people moving outside of a building **300**, people moving inside of a room). The motion detector **218***d* can be located at the distal end of the security system **202***c* such that the motion detector **218***d* faces away from the foot contact **618** of the security system **202***c*.

Furthermore, the security system **202***d* can include a rotatable camera housing **658**. A camera assembly **208***d* can be coupled to the rotatable camera housing **658** such that the camera assembly **208***d* rotates around the perimeter of the outer housing **634** of the security system **202***d* as the camera housing **658** rotates around the perimeter of the outer housing **634**. The camera housing **658** can rotate around a central axis **266** of the screw thread contact **614**.

In some embodiments, the camera housing **658** can rotate in response to an event, such as a person entering a room, outdoor area, or space adjacent to the security system **202***c*. For example, the motion detector **218***d* can detect the person (s), such as the visitor(s), and in response to the motion detector **218***d* detecting the person(s), the security system **202***c* can cause the camera housing **658** to rotate to a position whereby the camera assembly **208** can record an image and/or video of the person(s).

The camera housing **658** can be rotated via any number of rotation methods. In some embodiments, the rotation of the camera housing **658** is caused by a command from a remote computing device, such as a smart phone, tablet, or other cellular device. For example, a user of the remote computing device can input a command into an app that is run on the remote computing device. The command can then be transmitted from the remote computing device to the security system **202***c*, to thereby rotate the camera housing **658**.

Describing the camera housing **658** differently, the sidewall **680** of the security system **202***c* can comprise a first portion, such as an outer housing **634**, and a second portion, such as a rotatable camera housing **658**, which is distal to the first portion. The second portion, or rotatable camera housing **658**, can be rotatable about the first axis **266**. The camera housing **658** can be manually rotated by the user. For example, the user can grip the camera housing **658** with his or her hand and rotate the camera housing **658** to a desired position. As well, the camera housing **658** can be rotated by the security system **202***c*, such as, in response to an event. For example, when the security system **202***c* detects the visitor, via the motion detector **218***d*, the security system **202***c* can then determine whether the visitor is located within a field of vision of the camera **208**. Accordingly, in response to determining that the visitor is not located within the field of vision of the camera **208**, the security system **202***c* can rotate the second portion, or camera housing **658**. Furthermore, the security system **202***c* can rotate the camera **208** about the first axis until **266** the visitor is within a field of vision of the camera **208**.

Additionally, the security system **202***c* may be configured to receive an instruction from a remote computing device **204**. The instruction may include a command to rotate the second portion, or camera housing **658**, to any location as determined by the user of the remote computing device **204**. Accordingly, in response to receiving the instruction from the remote computing device **204**, the security system **202***c* may be configured to rotate the second portion such that the camera **208** rotates about the first axis **266**. As such, the user of the remote computing device **204** may be able to remotely rotate the camera housing **658** to thereby change the field of vision of the camera **208**.

The security system **202***d* can use a microphone **234** to listen for visitors. When the security system **202***d* detects visitors (e.g., via motion or sound), the security system **202***d* can turn on LED lights **626**, record sounds from the visitors, and/or take videos of the visitors. In some embodiments, the security system **202***d* records when visitors move by the security system **202***d*.

FIG. **10** illustrates a perspective view of electrical contacts. Connecting the security system **202***d* to the light socket **650** can enable the security system **202***d* to be electrically connected to a power supply.

FIG. **11** illustrates a side view of a security system **202***c* with a cone-shaped mirror **670**. Supports **662** can extend from an end of the security system **202***c* that is opposite an end that includes the screw thread contacts **614** (labeled in FIG. **12**).

FIG. **12** illustrates a perspective view of the security system with a cone-shaped mirror **670**. The camera assembly **208** can include a camera that is oriented towards the cone-shaped mirror to enable the security system **202***c* to record visitors in many directions around the security system **202***c*. Software can be used by the security system **202***c*, the remote comput-

ing device **204**, and/or the server **206** to reduce and/or eliminate distortion in pictures taken using the security system **202***c*.

FIG. **13***a* illustrates a side view of a security system **202***e* with a dome camera assembly **208***e*. The dome camera assembly **208***e* can have a shape that is half of a sphere. In some embodiments, the dome camera assembly **208***e* includes an outer cover **228** that has a curved and/or spherical shape (e.g., half of a sphere). The cover **228** can be a translucent material such as plastic and/or polycarbonate.

The field of vision **238** of the dome camera assembly **208***e* can include half of a sphere. In some embodiments, the field of vision **238** includes approximately 360 degrees around the base of the cover **228** and/or around a central axis **266** of the screw thread contacts **614**. In several embodiments, the field of vision **238** includes at least 330 degrees around the base of the cover **228**. In some embodiments, the field of vision **238** is approximately 180 degrees in a plane that includes the central axis **266** of the screw thread contacts **614** (e.g., in the plane represented by the page on which FIG. **13***a* appears). In several embodiments, the field of vision **238** is at least 140 degrees and/or less than 260 degrees in a plane that includes the central axis **266**.

FIGS. **13***b*-**13***e* further illustrate the field of vision in various embodiments. With specific reference to FIG. **13***b*, the field of vision **238***g* can be defined by a vertical field of vision **692***g* and a horizontal field of vision **694***g*. The vertical field of vision **692***g* can be any angle less than 180 degrees (as shown by the distal plane **693**), such as 140 degrees. Because FIGS. **13***b*-**13***e* are side views, the horizontal field of vision **692***g* and the vertical field of vision **694***g* are actually radial, meaning that they extend 360 degrees around the perimeter of the camera assembly **208***g*. This 360 degree periphery is further illustrated in FIG. **13***e*. FIG. **13***e* is a top down view, looking from above the security system (when it is mounted to the light socket **650**) to the ground below the security system. FIG. **13***e* shows that the horizontal field of vision **694**, **694***g* actually covers 360 degrees around the perimeter of the security system and the axis **266**. While the vertical field of vision is not illustrated in FIG. **13***e*, the vertical field of vision is also radial, in that it covers the 360 degree area around the security system.

The security system **202***h* illustrated in FIG. **13***c* may define a 180 degree vertical field of vision, which means that the camera assembly **208***h* is able to see anything that is level with or below the distal plane **693**.

Furthermore, as shown in FIG. **13***d*, the security system **202***j* may be configured to achieve a vertical field of vision **692***j* that is greater than 180 degrees. For example, some embodiments may have a vertical field of vision equal to at least 250 degrees, up to 250 degrees, up to 280 degrees, and in some embodiments, up to 300 degrees. (It should be appreciated that in some embodiments that utilize multiple cameras, a vertical field of vision of up to 360 degrees may be achieved.) In the embodiment shown in FIG. **13***d*, to accomplish a vertical field of vision greater than 180 degrees, the camera assembly **208***j* may be configured to move vertically downward. Specifically, the camera assembly **208***j* may be configured to move along a camera assembly direction of movement **209***j*, as shown in FIG. **13***d*. In this regard, the camera assembly **208***j* may thereby gain separation from the distal end of the security system **202***j*. This may allow the camera assembly **208***j* to achieve a greater line of sight past the sidewalls in the upward, or proximal, direction.

It should be appreciated that various methods may be used to retain the camera assembly **208***h* at various locations along the camera assembly direction of movement **209***h*. In some embodiments, the camera assembly **208***h* may be configured to engage mechanical latches to secure the camera assembly **208***h* at discrete locations along the direction of movement **209***h*. In some embodiments, the camera assembly **208***h* may be configured to be retained at any location along the direction of movement **209***h* via friction. In some embodiments, the camera assembly **208***h* may be threadably engaged and disengaged at various locations along the direction of movement **209***h*. As well, once the camera assembly **208***h* has been moved to its desired vertical position, the camera assembly **208***h* is still thereby mechanically and electrically coupled to the security system.

As well, it should be appreciated that the camera assembly **208***h* may be vertically moved along the direction of movement **209***h* in response to any command or manual movement. For example, the camera assembly **208***h* may be moved in response to a command from a remote computing device **204**. As well, the camera assembly **208***h* may be moved along the direction of movement **209***h* in response to detecting a visitor. For example, the camera assembly **208***h* may be positioned in a retracted position, whereby the camera assembly **208***h* is located substantially within the security system as shown in FIGS. **13***c* and **13***d*. Accordingly, in response to the motion detector **218** detecting a visitor, the camera assembly **208***h* may then move to an extended position (as shown in FIG. **13***d*) to capture a greater vertical field of vision than in the retracted position. Moreover, the camera assembly **208***h* may be manually moved by a user.

FIG. **14** illustrates a perspective view of the security system **202***e* from FIG. **13***a*. The dome camera assembly **208***e* can be used with any of the security systems described herein. The security system **202***e* can include lights (e.g., LEDs) on an end that is opposite the end that includes the screw thread contacts **614**.

Any of the security systems described herein can use the methods and systems described in U.S. Nonprovisional patent application Ser. No. 14/463,548; filed Aug. 19, 2014; and entitled DOORBELL COMMUNICATION SYSTEMS AND METHODS; the entire contents of which are incorporated herein by reference. For example, the grid sensor methods can be used with security systems **202***c*, **202***d*, and **202***e*. The security system embodiments described in U.S. Nonprovisional patent application Ser. No. 14/463,548 can be replaced with security systems **202***c*, **202***d*, and **202***e*. Security systems **202***c*, **202***d*, and **202***e* can be used in the context of the security systems described in any of the patent applications incorporated by reference.

Viewing Perspective

Many of the camera assemblies described herein can be mounted in diverse orientations. The mounting orientations might not be ideal viewing orientations. Embodiments can include changing the viewing orientations (e.g., viewing angles) via software (e.g., an "app") and/or via a user interface **240** on a display screen **242** of a computing device **204** (see FIG. **2**).

Cameras can be mounted in a lamp, jutting out of a wall (e.g., horizontally), and upside down (e.g., hanging down from a ceiling). The software and/or user interface **240** can enable users to select a button to adjust the viewing orientation a certain amount (e.g., 90 degrees).

FIG. **15** illustrates a user interface **240**. The image **252** in FIG. **15** is oriented as a landscape, which can span entire viewing portion of the display screen **242** of the remote computing device **204**. The user can adjust the viewing orientation by selecting an orientation button (not shown), or simply by rotating the remote computing device **204** to the position of the desired orientation (e.g. if you want to view portrait, just

the remote computing device rotate by ninety degrees as shown in FIG. **16**). Accordingly, in some embodiments, selecting the orientation button shifts the image **252** ninety degrees. FIG. **16** illustrates the new orientation of the image **252** after selecting the orientation button, or rotating the remote computing device **204** to the desired orientation.

In some embodiments, the security system automatically detects the orientation in which the camera is inserted into a light socket. The security system can then automatically adjust the viewing orientation in response to the detected orientation (e.g., so the image **252** appears right-side up). The security system can detect the inserted orientation via an accelerometer **274**.

Visitor Identification Embodiments

Many embodiments may utilize the visitor identification abilities of the person using the remote computing device **204** (shown in FIG. **1***a*). Various technologies, however, can be used to help the user of the remote computing device **204** to identify the visitor. Some embodiments use automated visitor identification that does not rely on the user, some embodiments use various technologies to help the user identify the visitor, and some embodiments display images and information (e.g., a guest name) to the user, but otherwise do not help the user identify the visitor.

Referring now to FIG. **1***a*, the camera assembly **208** can be configured to visually identify visitors through machine vision and/or image recognition. For example, the camera assembly **208** can take an image of the visitor. Software run by any portion of the system can then compare select facial features from the image to a facial database. In some embodiments, the select facial features include dimensions based on facial landmarks. For example, the distance between a visitor's eyes; the triangular shape between the eyes and nose; and the width of the mouth can be used to characterize a visitor and then to compare the visitor's characterization to a database of characterization information to match the visitor's characterization to an identity (e.g., an individual's name, authorization status, and classification). Some embodiments use three-dimensional visitor identification methods.

Some embodiments include facial recognition such that the camera assembly **208** waits until the camera assembly **208** has a good view of the person located near the security system **202***c* and then captures an image of the person's face.

Several embodiments can establish a visitor's identity by detecting a signal from a device associated with the visitor (e.g., detecting the visitor's smartphone). Examples of such a signal include Bluetooth, WiFi, RFID, NFC, and/or cellular telephone transmissions.

Furthermore, many embodiments can identify an identity of a visitor and determine whether the visitor is authorized to be located in a predetermined location. For example, the light socket **650** may be located in a room inside a building **300**. The security system **202***c* can determine whether the visitor is authorized to be located in the room. In response to determining that the visitor is not authorized to be located in the room, the security system **202***c* can transmit an alert to the remote computing device **204** to notify a user of the remote computing device **204** that the visitor is not authorized to be located in the room.

In some embodiments, the security system **202***c* may be located outside of a building **300**, for example, near a swimming pool. Accordingly, the security system **202***c* may be used to determine the identity of the visitor and thereby determine whether the visitor is authorized to be located near the swimming pool. This may allow the user to monitor the swimming pool to determine if small children and/or any other unauthorized people approach the swimming pool. In effect, the security system **202***c* can be used as a safety monitor.

Furthermore, the security system **202***c* can also sound an audible message to warn the visitor that he or she is not authorized to be located in the room or outdoor area (e.g. swimming pool). For example, in response to determining that the visitor is not authorized to be located in the room or outdoor area, the security system **202***c* may broadcast a predetermined audible message, via the speaker **236** in the security system **202***c*, to notify the visitor that the visitor is not authorized to be located in the room or outdoor area. The security system **202***c* may also be configured to allow the user of the remote computing device **204** to speak to the visitor that is not authorized to be located in the room or outdoor area. For example, if the user's child has approached the swimming pool, the user may speak a message into the remote computing device **204**, which may then be transmitted to the security system **202***c* and sounded via the speaker in the security system **202***c* (e.g. "Mitch, you are not allowed to be in the swimming pool after dark.").

Embodiments of the security system **202***c*, may also save a history of times when the visitor was detected in the room or outdoor area by the security system **202***c*. It should be appreciated that this may also be used for a variety of purposes. For example, the user may have a dog walker walk the user's dog when the user is gone at work. In this manner, the security system **202***c* may be configured to save a history of times when the dog walker arrives at the building **300**, which may allow the user may be able to oversee and determine if the dog walker is walking the user's dog as promised. This may be helpful when the user pays the dog walker's invoice. The user can review the history to determine whether the dog walker's visits to the buildings match the invoiced dates. The person of ordinary skill in the art will recognize a variety of situations to utilize this technology.

As well, the security system **202***c* may take action in response to determining that the visitor is authorized to be located in the room. For example, the security system **202***c* may transmit a second alert to the remote computing device **204**, wherein the second alert notifies the user of the remote computing device **204** that the visitor is located in the room. In some embodiments, the second alert may also notify the user of the remote computing device **204** that the visitor is authorized to be located in the room.

In order to determine the identity of the visitor, the security system may utilize any technology capable of identifying a person or a remote computing device, such as facial recognition of a visitor, near field communication of a remote computing device **204** (e.g. identifying a remote computing device **204** associated with the visitor via Bluetooth), and the like.

Methods of Detecting Visitors

It should be appreciated that this disclosure includes a variety of methods of using the security system to detect visitors, like the visitor **1700** shown in FIG. **17**. For example, as illustrated in FIG. **18**, some methods include using the security system **202** to detect a visitor (at step **1800**), and using the camera to take video of the visitor (at step **1802**). As well, some embodiments include transmitting the video to a remote computing device **204** (at step **1804**) and displaying the video on the remote computing device **204** (at step **1806**). This may effectively allow a remote user to monitor the activity around the security system **202**.

As shown in FIG. **19**, some methods may include orienting the security system **202** such that the foot contact **618** of the security system **202** faces a foot contact **654** of the light

socket **650** (at step **1900**). FIG. **19** further illustrates a method that may include attaching the security system **202** to the light socket **650** (at step **1902**) and electrically coupling foot contact **618** of the security system **202** to the foot contact **654** of the light socket **650**. This electrical coupling may thereby energize the security system **202** to power all of the onboard components.

FIG. **20** shows a method that includes using the security system **202** to determine whether the visitor is authorized to be located in a room or in a space that the security system **202** is monitoring (at step **2000**). In response to determining that the visitor is not authorized to be located in the room or the space, the method may further include using the security system **202** to transmit an alert to a remote computing device **204** (at step **2002**). The alert may be a warning message, such as a text message or email, which warns the user that the unauthorized visitor is located in the room or space. Accordingly, some methods may further include using the security system **202** to determine the identity of the visitor, for example, via facial recognition or detecting a smart phone through NFC (at step **2004**). As well, the identity of the visitor may be included in the alert that is sent to the remote user. For example, if the security system detects an unauthorized user, such as a toddler, near a swimming pool, the alert might say, "Timmy is located near the pool."

As shown in FIG. **21**, in response to determining that the visitor is not authorized to be located in the room or space, such as near or in the swimming pool, some methods may further include using the security system to broadcast a predetermined audible message (at step **2100**). Using the example in the previous paragraph to further illustrate, when the security system **202** detects the toddler near the swimming pool, the security system **202** might sound an audible message via the speaker **236**, such as, "PLEASE MOVE AWAY FROM THE POOL!"

Various methods may enable the visitor and remote user to communicate to each other through the security system **202**. For example, some methods may include transmitting a first audible message to a visitor (at step **2200**). In execution, the first audible message may be received by a microphone **234** in the remote computing device **204** and transmitted to the security system **202**. As well, the first audible message may be audibly transmitted to the visitor via the speaker **236** in the security system **202**. As well, methods may include transmitting a second audible message to a user of the remote computing device **204** (at step **2202**). The second audible message may be received by the microphone **234** in the security system **202** and transmitted to the remote computing device **204**. The second audible message may be audibly transmitted to the user via a speaker **236** in the remote computing device **204**.

As well, methods may include using the motion detector **218** to detect the visitor (at step **2300**) and using the security system **202** to determine whether the field of vision of the camera is illuminated (at step **2302**). In response to detecting the visitor and in response to determining that the field of vision is not illuminated, the method may further include illuminating the light **626** and/or **630** and using the camera **208** to record a video of the visitor (at step **2304**).

As illustrated in FIG. **24**, methods may include receiving a first instruction from the remote computing device (at step **2400**). In response to receiving the first instruction from the remote computing device **204**, methods may include using the security system **202** to illuminate the light (at step **2402**). As well, some methods may include receiving a second instruction from the remote computing device **204** (at step **2404**). In response to receiving the second instruction from the remote computing device **204**, methods may include using the security system **202** to de-activate the light **626** and/or **630** (at step **2406**). Methods may also include receiving a first audible instruction via the microphone **234** of the security system **202** (at step **2408**), and in response to receiving the first audible instruction from the visitor, the method may include using the security system **202** to illuminate the light **626** and/or **630** (at step **2410**). As well, some methods may include receiving a second audible instruction via the microphone **234** of the security system **202** (at step **2412**) and in response to receiving the second audible instruction from the visitor, the method may include using the security system **202** to de-activate the light **626** and/or **630** (at step **2414**).

FIG. **25** illustrates a method that includes orienting the security system **202** such that the proximal end **280** of the security system **202** faces a foot contact **654** of a light socket **650** (at step **2500**) and thereby rotating the security system **202** about a first axis **266** to thereby attach the security system **202** to the light socket **650** (at step **2502**). The method may also include electrically coupling the foot contact **618** of the security system **202** to the foot contact **654** of the light socket **650** (at step **2504**). Methods may include using the motion detector **218** to detect the visitor (at step **2506**) and in response to detecting the visitor, the methods may include using the security system **202** to determine whether the visitor is located within a field of vision **238** of the camera **208** (at step **2508**). In response to determining that the visitor is not within the field of vision **238** of the camera **208**, methods may include using the security system **202** to rotate the second portion such that the camera **208** rotates about the first axis **266** until the visitor is within a field of vision **238** of the camera **208** (at step **2510**).

Furthermore, as shown in FIG. **26**, methods may include using the security system **202** to receive an instruction from a remote computing device **204** (at step **2600**). The instruction may comprise a command to rotate the second portion, or camera rotatable housing **658**. In response to receiving the instruction from the remote computing device **204**, the method may include using the security system **204** to rotate the second portion such that the camera **208** rotates about the first axis **266** (at step **2602**). As well, as illustrated in FIG. **27**, some methods may include a first and second camera, and the methods associated may thereby include pivoting the second camera along at least a first direction and a second direction that is perpendicular to the first direction (at step **2700**).

Detecting Adverse Sounds

The security system **202**, or light socket camera, may also be configured to monitor a space by audibly detecting various sounds within the space. The sounds may be adverse sounds, which may include breaking glass, gunshots, shouting, screaming, and the like. In response to detecting the adverse sound(s) via the microphone **234**, the security system **202** may be configured to notify a party of the adverse sound(s). It should be appreciated that the adverse sound may comprise any type of sound to indicate that someone or something is in need of help, that a problem has occurred, a crime is being committed, and the like.

As illustrated in FIGS. **28***a*, **28***b*, **29** and **30**, the disclosure includes a method for detecting an adverse sound **2800** (at step **2900**). In response to detecting **2801** the adverse sound **2800**, the method may include using the security system **202** to notify a party **2804** (at step **2902**). The party **2804** to be notified may be any party that a user of the security system **202** may wish to contact, such as the user herself, or any contact listed on the user's contact list, such as a contact list stored within the user's remote computing device **204**. As well, the party **2804** may be an emergency dispatcher, such as a 9-1-1 dispatcher (in the U.S.) or a dispatcher who responds

to any emergency (in the U.S. or any other country). Generally, it should be appreciated that the party **2804** may be any party who may be interested in the occurrence of the adverse sound **2800**.

The security system **202** may notify the party **2804** by sending a notification from the security system **202** to a computing device **204** associated with the party **2804**. The security system **202** may transmit the notification through any wireless or wired technology. For example, the computing device **204** may receive the notification via a wireless technology such as radio frequency, WiFi (e.g., wireless local area network), cellular, Internet, Bluetooth, telecommunication, electromagnetic, infrared, light, sonic, and microwave. In this manner, the security system **202** may wirelessly communicate with the computing device **204** via the communication module **262** of the security system **202**, which may be configured to connect to a wireless communication network. Furthermore, the security system **202** may transmit the notification through a wired technology, such as through the copper wires within the building **300**, which may comprise a wired network. As well, the wired technology may include fiber-optics, Ethernet, telephone (e.g. digital subscribe line "DSL"), cable, and the like.

As well, in response to detecting the adverse sound **2800**, the method may further include using the camera **208** of the security system **202** to record one of an audio and video of an area adjacent the security system **202**. As shown in FIG. **28***c*, upon the security system **202** detecting the adverse sound, the security system **202** may then capture a video or an audio recording **2812** of an event **2814** in an area adjacent the adverse sound **2800**. The video and/or audio may be entered as evidence for a criminal investigation, or to determine liability in the event of a personal injury lawsuit. Upon capturing one of the audio and/or video, the method may further include transmitting the audio and/or video to the remote computing device **204**.

Aside from documenting the area adjacent the adverse sound **2800**, the security system **202** may also audibly sound a warning message through the speaker **236**. The warning message may be an audible warning to alert any person or animal within the area of the adverse sound **2800** to leave the area or perhaps that help is on the way. Once the warning message has been sounded, two-way communication may be conducted between a user of a remote computing device **204**, who is remotely located from the adverse sound **2800**, and a person or animal located nearby the adverse sound **2800**. In this manner, if a person is hurt on the ground near where the adverse sound was detected, the user may alert the hurt person that help is en route. It should also be appreciated that in response to detecting the adverse sound **2800**, the security system **202** may perform any other function such as flashing a warning light, perhaps to scare away perpetrators.

The security system **202** may also be configured to determine logistical information, which may be helpful to an emergency dispatcher. For example, in response to the adverse sound **2800**, the security system **202** may determine a location of the adverse sound **2800** with respect to its location inside or outside of the building **300**. In response to determining the location of the adverse sound **2800**, the security system **202** may transmit a notification of the location **2818** of the adverse sound **2800** to the party **2804**. This may be helpful to emergency personal in order to locate the site of the adverse sound **2800**, which may indicate the location of the victim, perpetrator, etc.

With reference to FIG. **28***e*, the method may include determining a type of the adverse sound **2800**, such as determining whether the adverse sound **2800** comprises a gunshot, scream, etc. In this regard, the security system **202** may include an internal processor to digitally analyze the adverse sound **2800** to determine the type of adverse sound. In some embodiments, the security system **202** may transmit a digital signal, which represents the adverse sound **2800**, to an external processor to be digitally analyzed to determine the type of adverse sound. Upon determining the type of adverse sound **2800**, the type of adverse sound **2800** may then be communicated to the party **2804**, via the remote computing device **204**. It should be appreciated that the notification as sent to the remote computing device **204** may be a text message, a phone call (such as a pre-recorded message), or any type of communication that notifies the party **2804** of the adverse sound **2800** and/or the type of the adverse sound.

As well, the security system **202** may also be configured to determine other biographical information such as a time of day that the adverse sound **2800** was detected. In response to determining the time of day of the adverse sound **2800**, transmitting a notification of the time of day to the party **2804**.

As illustrated in FIG. **28***f*, methods may include interaction between two security systems, whereby a first security system **202** notifies a second security system **203** of the adverse sound **2800**. For example, in response to detecting the adverse sound **2800**, the method may include using the first security system **202** to initiate an event at a second security system **203** communicatively coupled to the first security system **202**.

The second security system **203** may perform any event that may be performed by the first security system **202**. For example, the second security system **203** may sound an audible message through a speaker **236** of the second security system **203**. As well, the second security system **203** may flash a warning light, such as an LED, located on the second security system **203**.

In response to either sounding the audible message or flashing the warning light, the second security system **203** may also be configured to use a motion detector of the second security system **203** to detect a motion of a user within an area of the second security system **203**. In this manner, the first security system **202**, via the second security system **203**, may detect whether the user responds to the event or notification of the adverse sound **2800** as detected by the first security system **202**. If the second security system **203** does not detect motion of the user, the first security system **202** may initiate other events, such as an event at a third security system, not shown, or an event at a remote computing device **204**, such as a text message at a remote computing device **204**. The first security system **202** may continue initiating events until the first security system **202** receives confirmation that a user is aware of the adverse sound **2800** as detected by the first security system **202**.

The second security system **203** may also audibly project, via the speaker **236**, specific information relating to the adverse sound **2800** as detected by the first security system **202**. As such, the first security system **202** may be communicatively coupled to the second security system **203**, and the first security system **202** may communicate information to the second security system **203**, such as the type of adverse sound **2800**, the location of the sound, time, etc. For example, in response to a window pane being broken at a back door, the second security system **203** may project a message, "Broken glass detected at the back door!" In this regard, the second security system **203** may notify a user of the type of adverse sound detected, and also the location of the adverse sound.

As well, because the first security system **202** may be configured to determine and distinguish various types of sounds, the first security system **202** may also initiate specific events in response to the type of sound detected. For example,

the security system **202** may determine whether the adverse sound **2800** is a first sound or a second sound. In response to determining the adverse sound **2800** is the first sound, the first security system **202** may be configured to initiate a first event at the first security system **202** and/or the second security system **203**. In response to determining the adverse sound **2800** is the second sound, the first security system **202** may be configured to initiate a second event at the first security system **202** and/or the second security system **203**. It should be appreciated that the second event may be different than the first event. For example, the first sound may be a shouting noise and the first event may comprise flashing a warning light of the first security system **202** and/or the second security system **203**. As well, the second sound may be breaking glass and the second event may comprise sounding an audible alarm.

Generally, it should be appreciated that the first security system **202** may be configured to perform specific events in response to specific adverse sounds, as well as instructing the second security system **203** to perform specific events in response to detecting specific adverse sounds.

Moreover, in response to the first security system **202** detecting a first adverse sound, such as crashing noise, the first security system **202** may transmit a text message to the remote computing device **204** to notify the user of the first adverse sound. In response to the first security system **202** detecting a second adverse sound, such as a gunshot, the first security system **202** may notify an emergency dispatcher of the second adverse sound. Generally, in response to any type of adverse sound **2800**, the first security system **202** may be configured to perform any of the actions described throughout this disclosure.

Triggering Appliances

With reference to FIG. **34**, the security system **202**, or light socket camera, may further be configured to receive instructions from a user (at step **3400**), such as an audible instruction, and thereby trigger an appliance to perform an operation. For example, the user may audibly instruct the security system **202** to turn on a television. In this manner, the security system **202** may be configured to respond to a predetermined greeting, such as, "Hi Max" or "Hey Max," or a even predetermined name, such as, "Max." Audibly speaking the predetermined greeting or name can instruct the security system **202** to perform (via itself) or transmit a command to another appliance (at step **3402**) to perform anything stated after the predetermined greeting or name. In response to transmitting the trigger command to the appliance, the method can also include performing the operation via the appliance (at step **3404**). For example, if a user audibly says, "Hi Max, please unlock the front door," the security system **202** can transmit a command to a front door lock that is communicatively coupled to the security system **202**. In response to the command being transmitted to the door lock, the door lock can then move to the unlocked position, or if the door lock is already in the unlocked position, the door lock can simply remain in that position.

FIGS. **31***a*-**31***d* illustrate just one of the many examples of how the security system **202** may be used to receive an audible instruction **3102** from a user **3100**. As shown in FIGS. **31***a* and **31***b*, the user **3100** may audibly speak an instruction **3102**, such as "Hi Max. Turn on entryway lights and turn on TV and set it to channel **11**." The audible instruction **3102** may be received by the security system **202**, at which point it may transmit commands to various appliances. For example, the deactivated television **3106***a* may become activated (activated television **3106***b*) through a command sent via a wireless or wired connection to the television. Accordingly, the television **3106***b* may set it's input channel to channel **11**, in response to the user's audible instruction **3102**. As well, the deactivated light **3104***a* light may become illuminated **3104***b* via the command. Accordingly, the security system **202** may also deactivate the television **3106** and light **3104** as shown in FIGS. **31** *c* and **31** *d*.

Generally, it should be appreciated that the term "operation" can be broadly defined. For example, the term "operation" can include activate, deactivate, illuminate, begin, stop, end, change, pause, record, identify, run, make, detect, and the like. In this regard, the security system **202** can control any number of appliances to perform any type of operation that is within the normal use of the appliance.

Furthermore, the appliance can be any type of appliance that is communicatively coupled to the security system **202** via a wireless connection or a wired connection. For example, the appliance can be a light, lamp, shower, faucet, dishwasher, door lock, garage door opener, door, fan, ceiling fan, coffee maker, alarm clock, stereo, television, digital video recorder, cable box, digital video disc player, compact disc player, toaster, oven, range, microwave, streaming media player (such as Apple TV), HVAC system (heating, ventilating and air conditioning system), telephone, fax machine, shredder, blender, juicer, space heater, thermostat, camera (such as a nanny camera), power tool (such as a table saw, drill, chain saw, etc.), smoke alarm, a second security system **202** (such as a second light socket camera, or a security system that can be plugged directly into a wall outlet), and any appliance that may be electrically coupled to a building or any appliance that may be communicatively coupled to the security system **202**. Specific examples of appliance operations may include closing and/or opening a garage door, turning on and/or turning off a television, pausing a television, setting an input channel of a television to any desired station, changing television volume, making a cup of coffee via a coffee maker, setting a thermostat to a predetermined temperature, unlocking and/or locking a door lock, and the like.

As shown in FIGS. **31** *e* and **31** *f*, the security system **202** may trigger appliances located in different places throughout the house. For example, the security system **202** may receive a second audible instruction **3108**, and in response to the instruction **3108**, the security system **202** may activate an appliance, such as a light on the security system **202**, within the same room, such as bedroom **3112**, and also another appliance, such as living room light **3110**, located in a different room. In this regard, the security system **202** may be configured to control multiple appliances simultaneously, all the while the appliances may be located in the same location or different locations. As long as the appliances are communicatively coupled to the security system **202**, then the appliance can be located anywhere.

With reference to FIGS. **32***a* and **32***b*, the security system **202***a* may be located within an enclosed interior portion **3210** or along an exterior portion of the building **3212**. In this manner, the security system **202** may trigger appliances **3202**, **3204** located within the interior portion **3210** or exterior portion of the building **3212**. As well, the security system **202** itself may be located within the interior portion of the building **300** or along the exterior portion of the building **300**. Generally, and regardless of where the security system **202** is located, the security system **202** may be configured to simultaneously trigger appliances located inside the building, while also triggering other appliances located outside of the building **300**.

Some embodiments of the security system **202** can be configured to trigger appliances after predetermined period of time has passed. For example, the user may audibly instruct

the security system **202** to make a cup of coffee in five minutes. Accordingly, the security system **202** may wait five minutes before transmitting the command to the coffee maker. As well, some embodiments may be configured to determine how long it may take to make the cup of coffee and if the it takes two minutes to make the coffee, the security system **202** may transmit the command to the coffee maker in three minutes, which added together with the two minutes to make the coffee will equal five minutes total. However, this is just one of the many examples, and generally, it should be appreciated that the security system **202** may be configured to trigger any appliance after any amount of time and under any logical circumstances.

In some embodiments the security system **202** may be referred to as a first security system **202**. In this manner, some embodiments also include triggering a second security system **202**, such as a second light socket camera, to determine if another person is present in a different part of the building **300**. For example, the user may instruct the first security system **202** to determine if another person is present in the kitchen. In response to receiving the audible instruction, the first security system **202** may to transmit a command to the second security system **202** to determine whether someone is located within the kitchen. In response to the command, the second security system **202** may use a camera to scan the room and determine whether a person is present. As well, the user may wish to determine the identity of a person that may be present. For example, the audible instruction may further include an instruction to determine an identity of the visitor. In response to determining that the visitor is located within the kitchen, the second security system may determine the identity of the visitor, via any identity detection technology such as facial recognition, iris recognition, retina scanning, smart phone detection, and the like.

Accordingly, the first security system **202** may also be configured to determine the identity of a user or visitor. This technology may be implemented to prevent unauthorized users from activating specific appliances. For example, a parent may restrict a child from watching television. In this manner, the child may not be authorized to watch television at specific hours or at any time of day. In effect, the child may audibly instruct the security system **202** to activate a television. The security system **202** may then determine the identity of the child as being an unauthorized user, and in response to this determination, the security system **202** may not activate the television in conformance with the child's instruction. Alternatively, if an authorized user, such as an adult, were to audibly instruct the security system **202** to activate the television, then upon determining that the adult is in fact an authorized user, the security system **202** may transmit a command to the television to thereby activate the television. It should be appreciated that this feature may be implemented with any desired appliance, such as dangerous appliances, like a power tool.

With reference to FIGS. **33***a* and **33***b*, the security system **202** may transmit commands to any of the appliances **3300***a*, **3300***b* via a wireless **230** or wired connection **304**. For example, the security system **202** may use its communication module **262** to wirelessly **230** transmit the command to the selected appliance via one of Wi-Fi, Bluetooth, radio frequency, Near Field Communication, infrared, and any other wireless technology discussed in this disclosure.

As shown in FIG. **33***b*, security system **202** may use its communication module **262** to transmit the command to the appliance **3300***a*, **3300***b* via a wire **304** that is electrically and communicatively coupled to the security system **202**. For example, the wired connection may comprise a copper wire located within the building **300**. The copper wire may any type of traditional copper used for conducting electricity and WiFi throughout a building **300**. However, it should be appreciated that the wired communication any type of wired technology as described in this disclosure, such as Ethernet, telephone, and the like.

In some embodiments the security system **202** may be communicatively coupled, via the Internet, to a remote server. In this manner, the security system **202** may communicate with the remote server to thereby transmit the desired command to the appliance via a media access control address (MAC address). In this manner, the remote server digitally encodes the command and transmits the command to the appliance, whereby the appliance performs the desired operation as audibly instructed by the user. Sometimes the Internet connection may be unavailable and the security system **202** may be unable to communicate with the remote server. Accordingly, the security system **202** may still communicate with the desired appliance by transmitting the command from the security system **202**, to a WiFi router, and to the desired appliance. In this regard, the security system **202** is able to communicate to the appliance whether or not an Internet connection exists.

The situation may arise where the security system **202** is not communicatively coupled to the appliance within the building, or when the security system **202** is not electrically coupled to the building **300**. In this regard, the security system **202** may perform a check to determine whether connectivity or electricity is available, and in response to determining the security system **202** is not electrically coupled to the building **300** (or communicatively coupled to the appliance), the security system **202** may illuminate a light on the security system **202** to thereby illuminate an area adjacent the light socket camera. The illumination of the light may be performed in response to the audible instruction from the user. However, in some embodiments the light on the security system **202** may automatically be illuminated in response to losing connectivity and/or electricity. This may helpful in the event of a power outage when people are trying to navigate their way around the building **300**.

Combinations with Embodiments Incorporated by Reference

The embodiments described herein can be combined with any of the embodiments included in the applications incorporated by reference. In various embodiments, the security systems described herein can include features and methods described in the context of security systems from applications incorporated by reference.

Interpretation

None of the steps described herein is essential or indispensable. Any of the steps can be adjusted or modified. Other or additional steps can be used. Any portion of any of the steps, processes, structures, and/or devices disclosed or illustrated in one embodiment, flowchart, or example in this specification can be combined or used with or instead of any other portion of any of the steps, processes, structures, and/or devices disclosed or illustrated in a different embodiment, flowchart, or example. The embodiments and examples provided herein are not intended to be discrete and separate from each other.

The section headings and subheadings provided herein are nonlimiting. The section headings and subheadings do not represent or limit the full scope of the embodiments described in the sections to which the headings and subheadings pertain. For example, a section titled "Topic **1**" may include embodiments that do not pertain to Topic **1** and embodiments described in other sections may apply to and be combined with embodiments described within the "Topic **1**" section.

Some of the devices, systems, embodiments, and processes use computers. Each of the routines, processes, methods, and algorithms described in the preceding sections may be embodied in, and fully or partially automated by, code modules executed by one or more computers, computer processors, or machines configured to execute computer instructions. The code modules may be stored on any type of non-transitory computer-readable storage medium or tangible computer storage device, such as hard drives, solid state memory, flash memory, optical disc, and/or the like. The processes and algorithms may be implemented partially or wholly in application-specific circuitry. The results of the disclosed processes and process steps may be stored, persistently or otherwise, in any type of non-transitory computer storage such as, e.g., volatile or non-volatile storage.

The various features and processes described above may be used independently of one another, or may be combined in various ways. All possible combinations and subcombinations are intended to fall within the scope of this disclosure. In addition, certain method, event, state, or process blocks may be omitted in some implementations. The methods, steps, and processes described herein are also not limited to any particular sequence, and the blocks, steps, or states relating thereto can be performed in other sequences that are appropriate. For example, described tasks or events may be performed in an order other than the order specifically disclosed. Multiple steps may be combined in a single block or state. The example tasks or events may be performed in serial, in parallel, or in some other manner. Tasks or events may be added to or removed from the disclosed example embodiments. The example systems and components described herein may be configured differently than described. For example, elements may be added to, removed from, or rearranged compared to the disclosed example embodiments.

Conditional language used herein, such as, among others, "can," "could," "might," "may," "e.g.," and the like, unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey that certain embodiments include, while other embodiments do not include, certain features, elements and/or steps. Thus, such conditional language is not generally intended to imply that features, elements and/or steps are in any way required for one or more embodiments or that one or more embodiments necessarily include logic for deciding, with or without author input or prompting, whether these features, elements and/or steps are included or are to be performed in any particular embodiment. The terms "comprising," "including," "having," and the like are synonymous and are used inclusively, in an open-ended fashion, and do not exclude additional elements, features, acts, operations and so forth. Also, the term "or" is used in its inclusive sense (and not in its exclusive sense) so that when used, for example, to connect a list of elements, the term "or" means one, some, or all of the elements in the list. Conjunctive language such as the phrase "at least one of X, Y, and Z," unless specifically stated otherwise, is otherwise understood with the context as used in general to convey that an item, term, etc. may be either X, Y, or Z. Thus, such conjunctive language is not generally intended to imply that certain embodiments require at least one of X, at least one of Y, and at least one of Z to each be present.

The term "and/or" means that "and" applies to some embodiments and "or" applies to some embodiments. Thus, A, B, and/or C can be replaced with A, B, and C written in one sentence and A, B, or C written in another sentence. A, B, and/or C means that some embodiments can include A and B, some embodiments can include A and C, some embodiments can include B and C, some embodiments can only include A, some embodiments can include only B, some embodiments can include only C, and some embodiments can include A, B, and C. The term "and/or" is used to avoid unnecessary redundancy.

While certain example embodiments have been described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the inventions disclosed herein. Thus, nothing in the foregoing description is intended to imply that any particular feature, characteristic, step, module, or block is necessary or indispensable. Indeed, the novel methods and systems described herein may be embodied in a variety of other forms; furthermore, various omissions, substitutions, and changes in the form of the methods and systems described herein may be made without departing from the spirit of the inventions disclosed herein.

The following is claimed:

**1**. A method of using a light socket surveillance system to trigger an appliance that is communicatively coupled to the light socket surveillance system, wherein the light socket surveillance system includes a camera, a speaker, a microphone, and a screw thread contact configurable to rotatably attach to a light socket of a building, the method comprising:

receiving, by the microphone, an audible message spoken by a user, wherein the audible message comprises an instruction to perform an operation with the appliance;

in response to receiving the audible message,

performing the operation with the appliance.

**2**. The method of claim **1**, wherein the audible message is a first audible message comprising an instruction to activate the appliance, the method further comprising:

receiving, by the microphone, a second audible message spoken by the user, wherein the second audible message comprises an instruction to deactivate the appliance; and

in response to receiving the second audible message,

deactivating the appliance.

**3**. The method of claim **2**, wherein the building comprises an enclosed interior portion and an exterior portion opposite the interior portion, wherein at least a portion of the appliance is located along the exterior portion, and wherein at least a portion of the light socket surveillance system is located along one of the exterior portion and the interior portion.

**4**. The method of claim **2**, wherein the building comprises an enclosed interior portion and an exterior portion opposite the interior portion, wherein the appliance is located entirely within the interior portion, and wherein at least a portion of the light socket surveillance system is located along one of the exterior portion and the interior portion.

**5**. The method of claim **1**, wherein the building comprises a first room and a second room that is different from the first room, wherein the light socket surveillance system is located in the first room and the appliance is located in the second room.

**6**. The method of claim **1**, wherein the appliance is selected from the group consisting of a light and a door lock.

**7**. The method of claim **1**, wherein the appliance is a garage door opener, wherein the audible message is a first audible message comprising an instruction to move the garage door opener to an open position, and wherein performing the operation with the appliance comprises moving the garage door opener to the open position, the method further comprising:

receiving a second audible message spoken by the user, wherein the second audible message comprises an instruction to move the garage door opener to a closed position; and

in response to receiving the second audible message,

moving the garage door opener to the closed position.

**8**. The method of claim **1**, further comprising:

receiving a second audible message spoken by the user, wherein the second audible message comprises an instruction to move a door lock to a locked position, wherein the door lock is communicatively coupled to the light socket surveillance system; and

in response to receiving the second audible message, moving the door lock to the locked position.

**9**. The method of claim **1**, wherein the light socket surveillance system includes a communication module configured to connect to a network, the method further comprising transmitting the instruction to the appliance via a wire, wherein the wire is communicatively coupled to the light socket surveillance system to thereby connect the communication module to the network, and wherein the wire is electrically coupled to the light socket surveillance system to deliver electricity to the light socket surveillance system.

**10**. The method of claim **1**, in response to receiving the audible message, the method further comprising:

determining an identity of the user;

determining whether the user is an authorized user or an unauthorized user of the appliance;

in response to determining the user is an authorized user of the appliance, performing the operation with the appliance; and

in response to determining the user is an unauthorized user of the appliance, ceasing to perform the operation with the appliance.

**11**. A method of using a light socket surveillance system to perform an operation with a television that is communicatively coupled to the light socket surveillance system, wherein the light socket surveillance system includes a camera, a speaker, a microphone, and a screw thread contact configurable to rotatably attach to a light socket of a building, the method comprising:

receiving, by the microphone, an audible message from a user, wherein the audible message comprises an instruction to change a channel of the television; and

in response to receiving the audible message, changing the channel of the television.

**12**. The method of claim **11**, further comprising:

receiving, by the microphone, a second audible message from a user, wherein the second audible message comprises an instruction to activate the television;

in response to receiving the second audible message, activating the television.

**13**. The method of claim **12**, further comprising:

receiving a third audible message from a user, wherein the third audible message comprises an instruction to deactivate the television;

in response to receiving the third audible message, deactivating the television.

**14**. The method of claim **11**, further comprising:

receiving a second audible message from the user, wherein the second audible message comprises an instruction to activate a second appliance; and

in response to receiving the second audible message, activating the second appliance.

**15**. The method of claim **14**, further comprising:

receiving a third audible message from the user, wherein the third audible message comprises an instruction to activate a third appliance; and

in response to receiving the third audible message, activating the third appliance.

**16**. The method of claim **15**, wherein the second appliance comprises at least one of a door lock, a garage door opener, and a light, and wherein the third appliance comprises at least one of a door lock, a garage door opener, and a light.

**17**. A method of using a first light socket surveillance system to trigger a second light socket surveillance system that is communicatively coupled to the first light socket surveillance system, wherein each of the first light socket surveillance system and the second light socket surveillance system includes a camera, a speaker, a microphone, and a screw thread contact configurable to rotatably attach to a respective light socket of a building, the method comprising:

receiving, by the microphone, an audible message from a user, wherein the audible message comprises an instruction to perform an operation with the second light socket surveillance system; and

in response to receiving the audible message, performing the operation with the second light socket surveillance system.

**18**. The method of claim **17**, wherein the operation comprises illuminating a light of the second light socket surveillance system.

**19**. The method of claim **17**, wherein the operation comprises emitting a noise from the speaker of the second light socket surveillance system.

**20**. The method of claim **19**, wherein the audible message is spoken by the user, and wherein the noise comprises at least a portion of the audible message.

* * * * *